DOCUMENT RESUME

ED 275 091 EC 190 615

AUTHOR Croft, Diane L., Ed.
TITLE Add-Ons: The Ultimate Guide to Peripherals for the Blind Computer User.
PUB DATE Jan 86
NOTE 275p.
AVAILABLE FROM National Braille Press, Inc., 88 St. Stephen St., Boston, MA 02115 ($19.95 print copies including postage; $16.95 Braille and cassette editions, shipped Free Matter for the Blind; UPS: add $3.00; $30.00 overseas orders in any medium, including postage).
PUB TYPE Reference Materials - Directories/Catalogs (132) -- Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Blindness; Braille; *Computers; *Electronic Equipment; *Equipment Evaluation; Optical Scanners; *Sensory Aids; Technological Advancement; Telecommunications
IDENTIFIERS *Computer Peripheral Equipment

ABSTRACT

Detailed product information on peripherals for the blind computer user is provided and applications, availability, reliability, price, and selection considerations are described. Chapters address the following topics and product categories: (1) scanners (optical character readers, Kurzweil Reading Machine); (2) a buyer's guide to modems; (3) braille printers and translators; (4) a buyer's guide to inkprint printers; (5) selecting a speech synthesizer; (6) paperless braille devices; and (7) related products (e.g., Small Talk, Braille-n-Print, Lock-Lite). The book concludes with a selected listing of computer resources (manuals, books, and tapes). (JW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

6859

ADD-ONS

ED275091

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

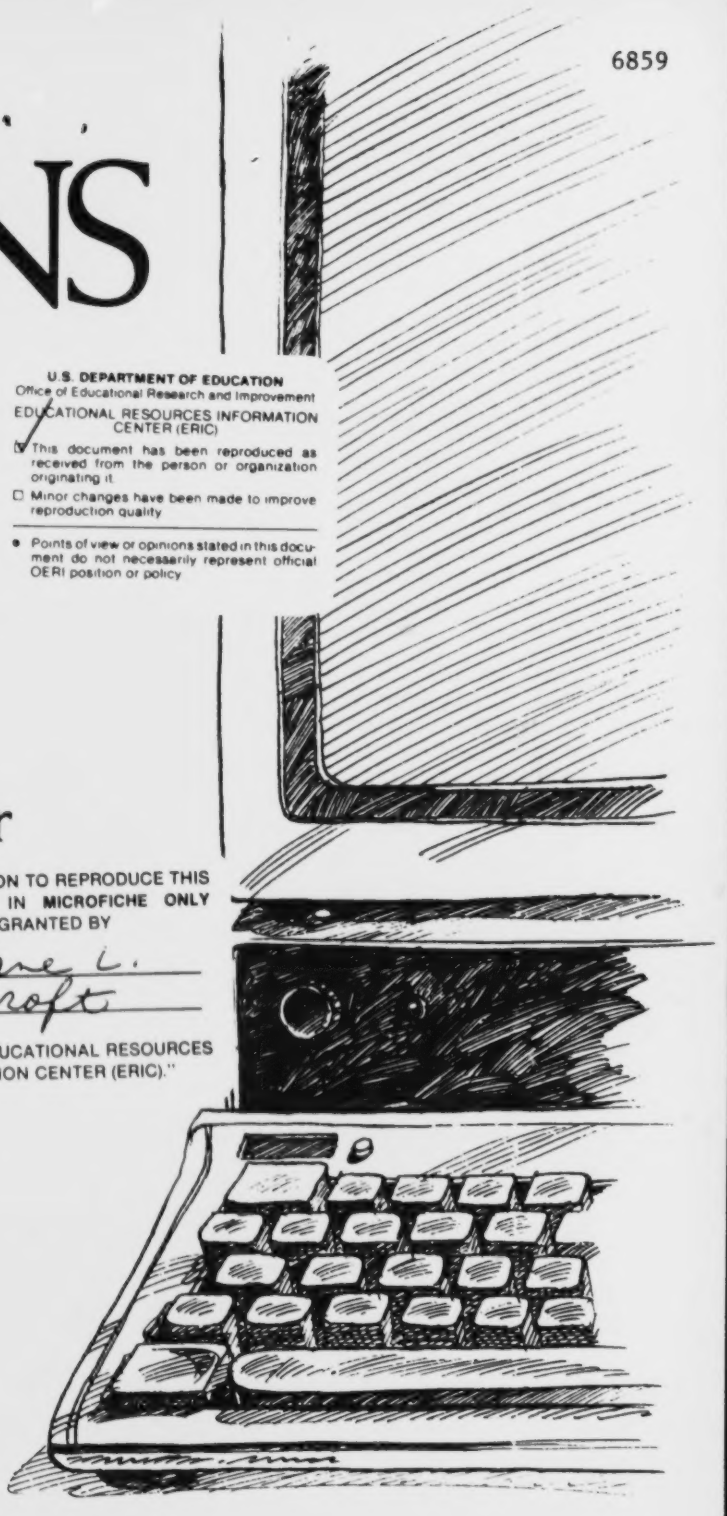
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

The *Ultimate* Guide to Peripherals for the Blind Computer User

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Diane L. Croft

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."



EC190615

Published by National Braille Press Inc.
88 St. Stephen Street, Boston, Massachusetts 02115 (617) 266-6160

January 1986

BEST COPY AVAILABLE

ADD-ONS

The *Ultimate* Guide to Peripherals for the Blind Computer User

Published by National Braille Press Inc.
88 St. Stephen Street, Boston, Massachusetts 02115 (617) 266-6160

January 1986

E 681.90 615

ADD-ONS
is published & distributed by
National Braille Press Inc.
88 St. Stephen Street
Boston, MA 02115

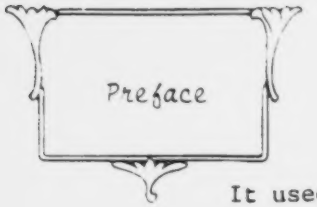
© 1986 by National Braille Press Inc.
All rights reserved. The reproduction of this book in any form is forbidden without the written permission of the publisher.

This book is available in print, braille, or cassette. Print copies are $19.95 (includes postage). Braille and cassette editions cost $16.95 (shipped FREE MATTER FOR THE BLIND; if you prefer UPS shipping, add $3). Overseas orders in any medium are $30, which includes postage.

Cover design courtesy Lisa Diercks
Illustration courtesy Jon McIntosh

"Nothing is obvious to the uninformed."

–from a Salada tea bag



It used to be a sign of old age to reminisce about the past: thinking back to a time when the simple, ordinary tasks of daily living held charm. Today, an attack of nostalgia is less a sign of advanced years than a response to the frenzied pace of a high-tech age. Too much, too fast, too soon. Change occurring in a day, rather than a decade.

And so, while thinking about peripherals, the subject of this book, I moved back through the revolving doors of childhood to remember my first experience with add-ons.

He wasn't very high-tech; and yet, he had all the component parts: oversized Kewpie-doll lips for speech; elephant ears for receiving data; round, bulging eyes for scanning information; even a funny-looking nose for sniffing out bugs. He was the essence of simplicity and creativity, and he was known as Mr. Potato Head.

In my day, Mr. Potato Head was only as good as your imagination and the peripherals that came in the box. A whole cast of characters awaited in the burlap bag of potatoes stored under the kitchen sink. If you added the lips, eyes, nose, and ears to a long, thin potato, he became Professor Potato Head. Choose a more rotund potato, and he resembled the neighborhood ice cream man. Nature supplied the pock marks, which often coincided with the placement of parts.

So, too, in the early days of computer technology, the entire nature of the beast was determined by the hodgepodge of peripherals that were

attached to the machine. It was as flexible as your imagination, and often as frustrating as a potato gone bad.

But the march of progress has eliminated much of the guesswork; certain parts fit in certain slots in certain machines which work together like a finely tuned automobile—at least they're supposed to. The early days of mix and match are somewhat less flexible now, replaced by the certainty of a perfect fit.

The reminder in all this is that life is never static, and that those who wish to keep abreast must keep moving with the times. With every change, there are some gains and some losses. Even Mr. Potato Head has gone high-tech: he comes with his own plastic head (one standard size that doesn't rot) with predetermined slots for the ears, eyes, nose, and lips. To keep the parts from getting lost, he has a trapdoor in the back for storage.

Kids today will never miss what was, but I can't help but wonder about the creative fun they've lost. So pardon me while I reminisce about an old friend, while looking forward at the same time, to what lies ahead.

ACKNOWLEDGMENTS

I believe that good things come in small packages. I really do. And when I first thought about this book on peripherals, I dreamed of it being a small, little book. Petite even.

But that was before the *Committee of Four Brave Men.* The committee meeting was called to order in the conference room at the National Braille Press one crystal clear August morning. Hunched over hot apple croissants and fresh-brewed coffee, Four Brave Men and One Timid Editor discussed the contents of the upcoming book on peripherals:

"It seems to me," started One Brave Man,
"there's really much to do.
For you can't have a chapter on braille printers,
without braille translators too."

"Here, here, I say," shouted the Second Brave Man,
"there's much to do indeed.
For if we consider what goes in...
What comes out, we also need."

And the Timid Editor saw the petite book fade away, and realized what she had done. For you can't invite Four Brave Men to leave a job half-done. And so this book belongs to them: Don Breda, Dick Gage, Al Gayzagian, and Barry Scheur. Thanks to their hard work and foresight, this book is much, much more.

Recognizing the imbalance of female representation on the committee, these four gents volunteered the services of Olga Espinola, who was drafted (in absentia) to write several reviews. Her contributions more than tipped the scales.

Thirteen other people volunteered their time to bring you current, pertinent information. A complete listing of contributors follows this section. All eighteen reviewers, who are blind, use the computer peripherals that are evaluated in this book. We believe that no one knows more about the idiosyncrasies of this technology than those who use it day after day.

Paul Griffitts prepared the Jiffy-Braille edition of this book and, as braille readers will testify, haste did not make waste. Joan Hanson was copy editor extraordinaire, taking out all my misplaced commas and reinserting them where they belong. The quality of the braille and print editions belongs to them.

Carl de Suze, a notable Boston radio personality, read the recorded edition of this book. Carl is, in a word, dashing. He spent over ten hours in a small, air-tight recording booth, which he affectionately said reminded him of his days covering the Vietnam war—in a helicopter. Carl makes the words on a page dance; often it's the steady, Latin beat of a tango, but when the jargon gets thick, he slows it down to a waltz. He's a fine dance partner.

Ray Fournier is the owner of Tape Time Corporation, where the recording took place. Ray, who is blind, suffered a heart attack two weeks before the first recording session was scheduled. From his hospital bed, he recruited several cronies to cover the recording sessions so the show could go on. To Ray, we award the Purple Heart: for heroics above and beyond the call of duty. We are so glad he could join us for the final session.

Jon Aldrich masterminded the recording in Ray's absence, despite his busy schedule as a radio jingle writer/producer. Jon also managed the final editing of the tape; when Carl sneezed, Jon cut. The result is a work of art.

And finally, although this is a professional book, the Editor's husband deserves a round of applause. He covered my half of the household tasks for two months straight. Thanks for the dirty dishes, loads of laundry, and all those home-cooked meals—especially the rack of lamb.

I agreed in the last book to confess in the next book that I know very little about computers. Let me put it this way. My mom telephoned me shortly after receiving the second computer book, "I got your book last week, dear, very nice. But I was talking to your sister, and we were just wondering: how is it that you write books on computers when you don't know anything about them?" Gee, thanks, Mom.

— Diane L. Croft
Editor

Gary Anderson is employed at Mass. Banking where he directs information calls to the right department. Several years ago, he purchased an inexpensive computer, taught himself BASIC programming, and has been dabbling in computer technology ever since.

Steven Booth is a Customer Service Representative for the Worcester County Institution for Savings, and also works weekends at a radio station. Prior to his position at WCiS, he worked for the Worcester Public Library where he provided technical training on the Kurzweil Reading Machine.

Don Breda works at National Braille Press where he is a PED operator and Systems Operator Assistant. He has been instrumental in several projects for producing VersaBraille cassettes from compositor's tapes. Don also consults to individuals and agencies regarding specialized computer devices for the blind.

Henry Brugsch, a graduate of Tufts University, works as a piano tuner in the Boston area. He is involved in developing software for the visually impaired user, and was instrumental in the development of Talking Termexec, a talking terminal program for the Apple.

Matthew Chao is employed as an Information Specialist at the Information Center for Individuals with Disabilities, an information and referral agency in Boston. About a year ago, he made an exhaustive search for the "right" computer system, and settled with the IBM PC/XT which has propelled him into every aspect of computer technology.

Duane Christianson is a Job and Training Modifier for the visually impaired at the Chicago Lighthouse, where he works with electronic and computerized equipment. He helped develop the Electronic Sensory Aids Training Program at the Lighthouse, also called the ESA Lab, which was funded by a grant from NIHR.

Olga Espinola got her first opportunity to explore computerland while working at the Worcester Institution for Savings—starting with a programmable calculator, then a KRM, snowballing to a VersaBraille and Apple, and finally learning Lotus 1-2-3 with an IBM. Currently, she works at Honeywell Information Systems where she programs in various languages to produce tutorials for the business community.

Dick Gage is a staff member at the IBM Scientific Center in Cambridge, Massachusetts where he frequently demonstrates the IBM PC to visually impaired audiences, as well as consults to institutions, users, and

IBMers. He was heavily involved in the development of PC Speak, talking software for the IBM PC.

Al Gayzagian is Director of Corporate Analysis and Planning for John Hancock Insurance Company, where he has been employed since 1952. He is also a member of the Board of Trustees for the National Braille Press and the Massachusetts Association for the Blind. He is an experienced VersaBraille and Apple user, and frequently gives demonstrations.

Fred Gissoni is Director of the Technical Services Unit at Kentucky Services for the Blind. For years, he has been involved in aids for the blind, dating back to 1960 when he worked with Tim Cranmer on an abacus. He spends a good deal of his time writing manuals.

B.T. Kimbrough is a well-known technical writer in this field, keeping consumers abreast of important technical developments in his "Off the Shelf" column for Dialogue Magazine. Recently, he assumed the position of Executive Vice President and General Manager at Triformation Systems, Inc. of Stuart, Florida.

Harvey Lauer is a Computer Technology Transfer Specialist for the Veterans Administration, where he teaches and evaluates computer equipment. He is a notable resource person in the field with a wealth of information which he freely shares.

Dean Martineau works for the Tacoma Area Coalition of Individuals with Disabilities as Coordinator of Services for the Blind. He uses an Apple IIe and Braille-Edit extensively and was one of fifteen users chosen to test the prepublication of BEX, a software program for the Apple.

Fred Noesner is Director of the Sensory Aids Department at Associated Services for the Blind in Philadelphia, Pennsylvania. His department operates SENSE-SATIONS, a retail store specializing in products for the blind. He is also president of Development Products, a small company specializing in adaptive aids for people with physical handicaps.

Gayle Sabonaitis, who is deaf-blind, holds an extra class license in ham radio. She first learned to use an IBM PC when someone loaned her one, and subsequently purchased a PCjr.

Barry Scheur is the managing partner for the Boston law office of Ober, Kaler, Grimes, and Shriver, specializing in developing and representing alternative health care systems. He and his computers logged 200,000 miles of travel last year, and he claims to have wasted more time and money on computers than anyone else he knows.

Doug Wakefield is President and founder of Talking Computers, Inc., a company which specializes in complete IBM PC and PC look-alike systems with speech. Talking Computers offers consultations, training, and—most important—support.

Richard Wright is Professor of Sociology and Head of the Department of Sociology and Social Work at Northern Michigan University. He uses braille, tapes, and speech synthesizers in conjunction with his administrative and instructional responsibilities at the University.

TABLE OF CONTENTS

Preface i

Acknowledgments iii

Contributors vi

CHAPTER 1: SCANNERS: GETTING THE INFORMATION IN 1

- It's All Relative 2
- Peripheral Vision: A Guide to Optical Character Readers 5
- Five Points to Consider Before You Buy 10
- Using the KRM as a Scanner 13
- Interfacing the KRM with a VersaBraille 19
- Mid-Range OCRs: Reliable and Reasonably Priced 23
- DEST Workless Station Optical Character Reader 41
- TOTEC TO-5000B Optical Character Reader 45
- The Oberon Omni-Reader: Recognition Becomes Affordable 48
- Omni-Reader Optical Character Reader 57

CHAPTER 2: A BUYER'S GUIDE TO MODEMS 59

- In Search of Modem Reviews 60
- A Buyer's Guide to Modems: From Bread & Butter to Caviar 62
- U.S. Robotics "Password" Modem 69
- Hayes Smartmodem 1200 71
- Modem Comparison Chart - Basic Features 73
- Modem Comparison Chart 75

CHAPTER 3: BRAILLE PRINTERS AND TRANSLATORS 77

- The Bumpy Road to Affordable Braille Printers 78
- Product Information 91
- Dipner Dots: Draft-Quality Braille Printing 92
- Braille Translators for Personal Computers 101
- Bill Grimm Talks about Braille-Talk 106
- Braille Translation Software 111

CHAPTER 4: A BUYER'S GUIDE TO INKPRINT PRINTERS 112

- Inkprint Printers: Getting It Down On Paper 113
- New and Improved Printers 121
- Great Little Printer: Portable Dot-Matrix Printer 122
- The Hewlett-Packard ThinkJet Printer 124
- ThinkJet Portable Ink-Jet Printer 131
- Gemini SG-10 Dot-Matrix Printer 132
- Epson FX-80 Dot-Matrix Printer 136

Okidata 192 Dot-Matrix Printer 141
Dot Matrix Plus Bells & Whistles: Proprinter 4201 146
Proprinter Dot-Matrix Printer 150
The Brother HR-15 Letter-Quality Printer 151
Brother HR-15 Daisy-Wheel Printer 158
Diablo 620 Daisy-Wheel Printer 160
Waiting for Good Print: Wheelprinter & Quietwriter 162
The Quietwriter Letter-Quality Dot-Matrix Printer 168

CHAPTER 5: SELECTING A SPEECH SYNTHESIZER 169

Can We Talk Here? 170
A Quick and Dirty Answer 176
Recommended Speech Synthesizers 177
Speech Synthesizers 179

CHAPTER 6: PAPERLESS BRAILLE DEVICES 181

Kentucky PortaBraille & PocketBraille 182
VersaBraille II Refreshable Braille Device 186
The Microbrailler MB-2400 197
Braille Display Processor or BDP 202

CHAPTER 7: ODDS AND ENDS 207

Small Talk: A Portable Talking Computer 208
A Closet Full of Cables 213
Braille-n-Print 218
Lock-Lite Keyboard Indicator for the IBM PC 221
MCI Mail: Making Sure It Gets There 225
Morse Enhancement Program 228
Product Announcements 230

CHAPTER 8: A COMPREHENSIVE (BUT NOT ALL-INCLUSIVE) LISTING 231

Associated Services for the Blind 233
Braille Inc.....235
Braille Institute 236
FlipTrack Learning Systems 238
Howe Press 242
Massachusetts Association for the Blind 243
National Braille Association, Inc.....245
National Braille Press Inc.....250
National Library Service for the Blind & Physically Handicapped.252
Raised Dot Computing 253
Recording for the Blind 254

RESOURCES 255

CHAPTER 1

Scanners: Getting the Information In

IT'S ALL RELATIVE

Ever since Homo sapiens first drew picture symbols on cave walls, words have reflected change. Certain words are plucked from the language and endowed with significance because they represent what is important to the times. For the cave dwellers, it was the symbol of the hunt, representing life itself. In the '60s, certain words flourished with the emergence of "hippies", who adopted an irreverence for the status quo, and a passion for the word "relevant." An oft-used expression, "Hey, man, is that relevant?" implied a whole new approach to cosmic circumstance.

Today, language is peppered with tech-talk. *Quelle horreur!* While those-in-the-know delight in technical, verbal warfare, most of us suffer from asynchronous burnout.

The good news is that the French, who possess a perfectly lovely language, are fighting back. A purity-of-speech campaign is under way to fight American computer jargon. Adopting such foreign language computerese "is submitting to the language of the conqueror," says General Jean Becam, president of the Association of French-Speaking Computer Specialists. Over the past few years, the association has drawn drawn up lists of approved French computer terms, outlawing the English originals.

But whether or not the French succeed in sweetening-up our technical mumbo jumbo, I fear that what's "relevant" today is in no way related to the social applicability of the Sixties. "Having relevance"

today is what Noah Webster defined it as over 100 years ago — "dependent on or interconnected with something else for intelligibility or significance: relative."

"Relative" is a big word in today's high-tech vocabulary. Show me one piece of computer paraphernalia that isn't dependent on another for intelligibility or significance, and I'll show you a broken machine. And machines are relative in another way. The first cassette-based microcomputer seemed incredibly fast — until disks showed up. Three-hundred baud seemed fast until 1200 baud and now 2400 baud....well, you get the point. It's all relative.

Webster's second definition for the word "relative" is the primary purpose of this book: "regarded in comparison to or relationship with something else." It's hard to know how good, or bad, something is until it is compared to something else of a similar nature. When we could, we tried to offer comparisons between different but similar devices in this book. For the chapter on scanners, the prospect for comparative reviews looked dim — given that no one I know owns more than one. But then *PC Magazine* published a comparative review of scanners and generously granted us permission to reprint it.

Since this book is specifically geared for blind computer users, comments from blind users of these scanners follow each reprint. (A similar format is followed in the chapter on inkprint printers.) The only exception is the Hendrix TR 100, for which we could not find a blind owner/operator. I debated leaving the review out, but was advised by a heavy scanner user that the Hendrix may, in fact, be one

of the best scanners for a blind operator; so I left it in. Perhaps it will inspire someone to call the company and try one out.

Whether or not to include the review of the Omni-Reader was another dilemma. One one hand, it's the least expensive scanner on the market. But on the other hand, it's lousy for a blind operator. In the end, I left it in because it may still be useful. Let's say you need to have a lot of typewritten material entered into your computer on a weekly basis for reading, editing, or studying. And let's say you have been paying someone $5 an hour to type it in. In this case, it may be cheaper, by paying someone minimum wage, and quicker, to have someone scan it into your computer using the Omni-Reader, which scans approximately twice as fast as the average typist can type. This may be particularly useful in a university setting where students could drop off their classroom handouts to the Office for Disabled Students (or facsimile) and pick them up on disk after they had been scanned.

Finally, one last warning: the reprints from the computer magazines that appear in this book are not for the weak-of-heart. We tried very hard to siphon out complicated terminology and jargon — but computer magazines are geared to a technical audience. Since both tech-heads and novices will be reading this book, we can say that it offers something for everyone. But if you are just getting started, you may prefer to skip over the reprints until you have a better grip on technical matters. Some of it is rough sailing.

PERIPHERAL VISION:
A GUIDE TO OPTICAL CHARACTER READERS

by Tom Stanton

(Reprinted from PC Magazine, July 9, 1985. Copyright ©1985 Ziff-Davis Publishing Co.)

Optical character readers can make your life much easier by reducing both typing time and costs. The current crop of machines offers a wide variety of capabilities and prices. Entering data into your PC is not one of life's little pleasures. Even if you're a highly skilled typist, it takes time to type page after page of text. And if you have to pay someone to do the work, you quickly discover it takes both time and money—a lot of money. The cost of entering data by hand continues to rise, although the cost of electronically storing and using that data is dramatically declining.

One possible solution is optical character recognition technology. An optical character reader (OCR) with a PC interface can scan pages of text, digitize them, and convert the digitized patterns into ASCII data that can be manipulated via software by almost any computer. An OCR can be 10 to 20 times faster than a typist and many times more reliable.

On the high end of the market is the Kurzweil 4000 ($35,000), a sophisticated OCR that can read proportionally spaced characters in books, magazines, and newspapers. Kurzweil Computer Products calls it an "intelligent scanning system," a claim that is not without merit. This system represents the state of the art in character recognition technology.

The midrange systems ($6,000 to $11,000) include DEST's Models 211, 212, and 213; TOTEC's TO-5000; and Hendrix's TR100. These optical character reader systems are designed for routine scanning of large amounts of typewritten text or typewriter-quality text. While these systems lack the sophistication of the Kurzweil 4000, they are responsible for the renewed interest in optical character recognition technology. They offer high performance at a reasonable price—a combination that until recently was impossible to achieve.

Oberon International has already gone well below the average $8,000 price with its new Omni-Reader, a hand-operated OCR that sells for $500. Despite the low price tag, the Omni-Reader includes the same basic features that are found in the more expensive models.

TEMPLATE MATCHING

OCRs use one of two methods to compare and match characters: template matching, which is the most common, and pattern recognition, a relatively new process.

Template matching, as its name implies, compares scanned data against a standard character template. Digital templates for various typefaces, like Courier and Prestige, are stored in PROMs on the OCR and can be changed depending on the typeface of the material currently being scanned. Most template-matching systems do not have to use a full 24- by 32-pixel frame to make a satisfactory match. In fact, most characters can be matched using only half or less of the template's digital information.

Scanned characters may go through the table in a loop several times until the reader finds a successful match. The process of matching characters within the loop is accelerated by repeating the most common letters, such as *e*, *s*, and *t*, over and over in the table. If a match cannot be found within the loop, the OCR may tilt characters in the table and run the loop again. Some systems run characters through a digital filter to clean up the copy and then try to match them again. When every other attempt at reading the character fails, the system alerts the operator so that he or she can enter the character manually.

A STEP BEYOND

Pattern recognition goes a step or two beyond template matching. Instead of looking for an exact match against a template master, the reader scans the shape of characters and compares them against a shape table. For instance, if the reader scans a vertical bar followed by a semicircle attached halfway down, a pattern-recognition algorithm determines that the bar and semicircle describe the letter *b*. A circle followed by a bar would be read as the letter *d*.

Pattern recognition offers a considerable advantage in flexibility over template matching because the shape tables can be instructed to read a variety of type styles. One of the big advantages to this method is that the OCR can read proportional print. Most OCRs use a fixed character frame that approximates monospacing on typewriters (10 pitch, for example, means that all the characters take up 1/10 inch). Proportionally spaced characters found in books confound these machines because the letter *i* may be only 1/3 as wide as the letter *n*.

Template-matching systems cannot read italic and boldface type or other variations.

Another advantage to pattern recognition is that a reader can "learn" a typeface, including italic and boldface characters. An operator starts the process by feeding the proper font information to the shape table and then, in most cases runs a series of scans to teach the specific patterns unique to that typeface to the machine. As the machine learns the typeface, the operator intervention decreases.

The algorithms used in shape tables require exceptional resolution on the part of the scanner and considerable computing resources. For example, the Kurzweil 4000 requires minicomputer power and memory in megabytes--hardly a desktop machine that you'd use to scan a business letter.

FUTURE DEVELOPMENTS

The next big development in optical character recognition technology--the ability to read handwritten text--already exists. The Internal Revenue Service uses OCRs to scan handwritten tax forms, and several other government agencies have similar systems.

Several companies are currently attempting to develop machines similar to the Kurzweil 4000. Although many machines can read typewritten text, true proportional text recognition will probably remain the domain of the Kurzweil 4000 for the next few years. But as both optical and digital technologies develop, a desktop scanner may be able to read a book by the end of this decade.

The OCR hardware is only part of the problem for the delay. Developing template-matching and pattern recognition software that quickly makes a match is where most of the work remains to be done. Artificial intelligence techniques have been suggested, but most are still under development. The most likely integration of artificial intelligence will be in the field of expert systems; specialized software will be trained on a variety of specific typefaces and will learn to recognize a letter without having to know which typeface is being used.

OCRs with pattern recognition abilities may hit the market sooner than expected. Once OCRs are able to scan books and convert the text to data at high speeds, the process of amassing a huge database can begin. In fact, OCRs may hold the key to the ultimate success of artificial intelligence software--by becoming the eyes of the computer.

FIVE POINTS TO CONSIDER BEFORE YOU BUY

by Barry Scheur

Most of the focus, so far, on computer access for the blind has been on getting information *out* of a computer through speech or braille output. Very little attention has been focused on getting information *into* a computer through media transfer or by scanning it. Depending on the situation, getting the necessary information into a computer can be as important as getting it out. This makes the entree of several new moderately-priced scanners worthy of consideration. The smart buyer should carefully analyze his or her information needs and keep the following five points in mind:

(1) Are the typefaces which you most commonly use readable by the scanner? For example, will you be scanning mostly typewritten material or material produced on a dot-matrix printer? Are your needs for scanning related to typeset material such as books, magazines, or newspapers? Only the Kurzweil Reading Machine can handle typeset material and most scanners can handle only a limited number (2-12) of different type styles. Plus, once you start adding type fonts, the price goes up considerably. Make sure your needs justify the expense.

(2) Once the information has been scanned in, you need to access it through speech or braille output. To do this efficiently, you need to understand or correct scanning errors. Even on a clear original, scanners can mistake one print letter for another. If you are listening

to a scanned document, you may not be able to understand the text without first correcting the error. A feature which makes this process easier is when a scanner, rather than guessing at an unrecognizable character, replaces it with an "error" symbol, like a "?" or a space. This makes it easier for the user to fill in the missing character later. Otherwise, erroneous characters entered into the text are extremely difficult to locate and correct.

(3) If you plan to share the scanner with other users, be sure your scanner can accommodate the formatting requirements and interface parameters of multiple devices. For example, if you plan to use the scanner with a VersaBraille and your sighted co-workers plan to use it with their computer systems, make sure either the scanner settings and page formatting configurations are easily changeable, or that multiple independent connections for more than one device are available.

(4) If you intend to access the scanned information through a speech synthesizer but without a computer, you should consider the manner in which the scanner reads. In other words, some scanners scan a line, then read a line, then scan the next line, etc. Others scan an entire page. The second approach is preferable for listening to or recording from a scanner.

(5) If you plan to use the scanner independently—as opposed to having your secretary do it—make sure the machine is easy to operate. Some scanners require more "operator intervention" than others. Try to get a "hands on" demonstration from a company representative, scanning the

kinds of materials you typically use and with the device connected to your particular system.

These planning considerations will help maximize your and your company's investment and provide you with a device that can truly be a "window on print" for a visually impaired person.

Using the Kurzweil Reading Machine
As a Scanner

by Steven Booth

PRODUCT: Kurzweil Reading Machine
Series 400

SOURCE: Kurzweil Computer Products Inc.
185 Albany Street
Cambridge, MA 02139
(617) 864-4700 or (800) 343-0311

PRICE: $29,800 with disk drive & software

REQUIRES: RS-232 cable

THE DUAL FUNCTIONS OF THE KRM

The Kurzweil Reading Machine, or KRM for short, is a special scanning device which converts several hundred types and styles of print into speech for use by the blind and visually impaired. Although its primary application is as a reading machine, for the purpose of this chapter on scanners, I will examine its application as a scanning device. The KRM is distinct from the Kurzweil 4000 scanner, which is commonly used in offices where large amounts of print must be electronically scanned for storage and later use, such as by a database.

KRMs come in various models and are currently being used in schools, libraries, employment situations, and agencies of and for the blind. The price of the KRM limits its availability for personal or home use. That is, unless you are a veteran, in which case you might be eligible for one for your personal use in school or on the job.

USING THE KRM AS A SCANNER

The basic KRM is a flat desk-top unit similar to a photocopier with a flat, glass surface and frames on each side which hold the printed material. Another section of the machine houses the computer components including the boards, cable connections, and a tape or disk drive for the software. A separate keyboard is attached to the back of the computer, via a cable, and can be moved or conveniently placed on your lap. All functions are accomplished from the keyboard.

Whether the KRM is being used to read to a blind person or to scan information electronically, the process is the same. A camera moves under the glass surface, scanning each line of print bidirectionally, to convert the optical characters on the page to electronic signals which the computer analyzes for speech or serial output.

A thorough, technical explanation of the scanning process is not appropriate for this article but, simply put, the process is as follows:

1. The scanner sends an image to the computer for an analysis of the character's properties;
2. The computer contrasts the properties of the character being sent with those stored in its memory;
3. The characters are grouped together into words;
4. Pronunciation is computed;
5. Sound is converted into speech, taking into account syntax and punctuation.

The beauty of the KRM is its unique shape recognition system, which allows the optical character reader to "learn" new characters and type styles and can read, therefore, many books and typeset materials. Since the KRM can learn new characters, its reading improves

and becomes more accurate with use. If the machine has difficulty with a type style the first time around, it may become more accurate by running the pages through a second time. This machine—unlike most OCRs—recognizes shapes, not typefaces, a process which more closely approximates human reading.

When the OCR encounters a character it doesn't understand, it may mispronounce it. This generally happens when the word does not conform to a phonetic rule, like knife, or because the character is not recognized when compared to the characters stored in its memory.

The problem of scanning errors is less troublesome when using the KRM as a reading machine. Most words can be understood when used in context. However, when scanning a document to be downloaded onto a computer for later use, these errors become more bothersome. A user can send the KRM output to a refreshable braille device or a computer and edit it from there. Although this sounds time-consuming, it sure beats the old system of listening to someone read the whole document to you.

Using the KRM as a scanner could be improved if the voice could be turned off while downloading documents. Another nice feature would be the ability to adjust the scanning speed manually.

Depending on the individual, 5-10 hours of training is required to master the keyboard. For a very simple job, a user could become familiar with the machine in a much shorter time, while the user who wants to use all of the capabilities of the KRM will require much more time.

WHAT ARE THE ADVANTAGES OF THE KRM?

The chief advantage of the KRM is the speed of access it offers to a wide variety of printed and typeset materials. A visually impaired person can access large amounts of data quickly, and can store the material for later use by downloading it to a computer or electronic device. (See the accompanying article for information on interfacing the KRM.)

Another advantage is that you do not have to scan information by hand. In other words, since the camera moves with the touch of a key, no intensive training is necessary for tracking and print formatting. The machine is equipped with a switch which allows you to read the left side or right side of the page, since it starts the scanner at either the right side or left side of the scanning surface. You can also direct the camera down the page by lines or inches with the keyboard. The software tapes are periodically updated to enhance the scanning and recognition capabilities of the KRM. The speed varies depending on the type of print being read, but generally it can read a full page of print in less than 2 minutes.

WHAT ARE THE DISADVANTAGES OF THE KRM?

Other than price, the KRM has some difficulty with some types of print, although far less than other OCRs. The OCR tries to match what it sees with similar letter and word shapes stored in its memory. But print styles, contrast, and format vary considerably. Most braille and talking book readers do not realize the multitude of print styles and format that exist. The variety of type fonts, proportional spacing,

pictures, and graphs makes it difficult for the computer to analyze the data correctly.

The quality of paper is another factor. Thin paper may not work if the camera lights see through it and the print bleeds through from the reverse side. If the print is degraded or choppy, this poses a problem as well. Or, as the old saying goes: garbage in, garbage out.

Pictures present obstacles for the OCR when it tries to convert the light and dark images into letters. You may hear guttural speech or characters which are not present, such as a number of equals or zeros spoken in a row. The latest software versions, such as the 2400, have improved the learning contrast functions that allow the machine to learn each new type style as a page is read. Another improvement is better format analysis which enables a user to move the scanner to certain locations, while avoiding such things as pictures. The machine will even tell you if there are columns; or, you can insert a piece of paper under unwanted columns.

A third problem with the KRM is that it cannot read handwriting—nor can any other OCR. This is a familiar problem for Optacon users. Then, too, sighted people often have trouble reading someone else's handwriting.

COMMENTS & CONCLUSION

Perhaps the single, most important thing to say about the usefulness of the KRM is that it depends on the types of documents to be scanned and on individual preferences. There are some materials which are best read in braille, others that read more easily on cassette,

and still others which are better managed with a human reader. The same is true with the KRM; depending on the document and individual preferences, it may or may not be the best method for accessing information. It is an individual choice and one that comes with experience.

There have been many enhancements during the five years I have been using the KRM; numerous software versions have been released which improve the scanning and control functions. Newer scanning design has improved the reading function as well. And even greater control of the scanner is being developed with new software and a speech board which makes the synthetic speech easier to understand. The new modem can send data at a higher baud rate which speeds the conversion to computers and braille output devices.

Kurzweil Computer Products is eager to hear from KRM users and values consumer input. Since Xerox purchased the company in 1980, they have donated hundreds of machines to libraries and universities in honor of the International Year of the Disabled Person. This means that a blind individual, who cannot afford the luxury of owning a scanning device, can possibly access one through a local library or university. For a listing of KRMs located across the country, contact the Marketing Department, Kurzweil Computer Products, at their toll-free number listed at the back of this book.

Interfacing the Kurzweil Reading Machine With a VersaBraille

by Olga Espinola

The strongest feature of the KRM is its flexibility; it can read an amazing variety of print styles. This fact makes it very tempting to use the KRM to transcribe large volumes of text. It comes equipped with a serial port and can be interfaced with a paperless braille device, like a VersaBraille, or with an Apple IIc. Since these devices are portable and the KRM is not, the practical solution is to cart your micro over to the nearest KRM—assuming one is near—and simply turn the pages while it transcribes.

The interface of the KRM and the VersaBraille is fairly simple. The VersaBraille's communications parameters must be set very accurately to avoid unwanted pests like extra line feeds or garbage braille (if the baud rate is wrong). On the older Model 3 KRM, the baud rate cannot be higher than 4800; the newer Model 4 can handle 9600. Either way, the speed of transmission is much, much faster than normal input typing.

In most cases, cabling is not a problem although a gender changer may be required depending on the model of KRM and micro being connected. Once the parameters are established, they can be saved on the micro for future use. Little needs to be done to prepare the KRM to send data to the micro. Once the machines are properly cabled, and the micro is ready to receive input, you simply issue a special command 45 on the KRM. This function prepares the KRM for the user. After that, any text the KRM reads will be transmitted.

One drawback to using the KRM as a scanner is that the speech can not be turned off while it is sending to another device. Even at the maximum speed, this is a nuisance. In fact, the speech actually waits for the micro when it is saving a page. It would be more convenient to have a "speech off" function on the KRM. This feature was probably not included in the original design because the machine was primarily built as a reading machine.

Another minor problem is the performance of the scanner when it runs into graphics, a diagram, or print that is too large or underlined; it will probably read garbage text. This is sent to the micro along with the good text. Later, when the user takes the text home to read, she finds a large editing job ahead of her. One advantage of having the speech on is that you know when this problem occurs; the speech sounds strange and allows the user some control. If caught early enough, the user can pause the KRM and get the micro off-line. The user can then resume reading on the KRM, perhaps skipping lines, until the text clears up. After that it's easy to recommence transmission by returning the micro on-line.

One major problem exists when using the KRM as a scanner. When the mid-priced scanners, such as the DEST or TOTEC, see an unknown character, they place a symbol like "@" in its place. Later, when the user is reviewing the text, it is easier to replace an "@" with the proper character based on context. In many cases, a global search and replace feature of the word processor can perform this task. This does not happen when the KRM sees an unknown character.

Since the primary purpose of the KRM is to "read" to the blind, it will always guess the pronunciation of a character it doesn't recognize. Consequently, when the text is transmitted to a computer, many wrong characters can be sent. For example, "I" can be mistaken for a "T", an "L" for a "1", a "G" for an "S." It can be a tedious task to clean up the text.

As a reading machine, it makes sense to have it pronounce everything it can. However, by adding a "speech off" feature, this function could be suppressed when sending data to an external device. If it is unrecognizable, the KRM could indicate it with an "@" symbol. The Kurzweil developers need to understand that more and more of us are using the KRM in this way.

COMMENTS & CONCLUSION

The KRM is the most complex scanner to operate of all the OCRs on the market today. It is also the most expensive, and its high-cost service contracts make KRMs difficult for libraries and schools to maintain.

On the other hand, the KRM offers the greatest access to the widest variety of printed materials of any OCR. It has made accessible an enormous variety of materials that a blind person never dreamed of being able to read. Its ability to transcribe huge quantities of text quickly makes it a real timesaver. An entire book can be ready in braille (with a paperless braille device) in a third of the time it took before.

But the full value of the KRM will not be realized until blind people change their attitudes. Many KRMs sit idly in dusty corners because people can't be bothered to "go to the machine."

We all look forward to the day when the price comes down—along with the size—and the KRM is recognized for just how much it can truly do for the visually handicapped.

MID-RANGE OCRs
RELIABLE AND REASONABLY PRICED

by Tom Stanton & Craig L. Stark

(Reprinted from PC Magazine, July 9, 1985. Copyright © 1985 Ziff-Davis Publishing Co.)

The ultimate aim of the new desktop optical character readers is to make optical character recognition a commonplace. The best of these machines are compact, efficient, reliable, and inconspicuous. They cloak their operations beneath beige exteriors that make them look no more complex than an average photocopier, and they are nearly as easy to operate: A stack of sheets is placed in one bin, a button is pushed, characters scroll by on the screen, disk drives whir and whisper, and the sheets are stacked on a bin below.

DEST Corporation's Models 211 and 212, TOTEC's TO-5000, and Hendrix's TR100 all fall into the middle of the OCR spectrum, ranging in price from about $6,000 to $11,000. These desktop OCR systems are designed for routine scanning of typewritten text or letter-quality printing and can handle fairly large amounts of text. (Most systems average 120 pages per hour.) Although they lack the power of larger OCR systems to read proportional text, their high scanning speeds and relatively low price tags represent a major breakthrough in automated data entry.

All these OCRs work more or less the same way: A page is fed into the system, characters are digitized, then each character is compared against a table of known characters in the OCR's memory. Each successful match generates an ASCII character, which is sent to the host system.

Most commercial OCR systems use this method, called template matching.

Digitizing a page of type is often more difficult than digitizing a picture. Line drawings and photographs can be digitized in fairly large swatches, and as long as the basic image is transmitted correctly, the tolerance for shading of gray areas is fairly wide. Digitized graphics do not have to match another digitized image; they are original images, transmitted "as is" and corrected as necessary on the host system.

A page of type has no gray areas, only black and white. Instead of digitizing a wide area, OCRs must focus on a single, 1/6-inch-high line of characters. Once digitized, each character must be isolated and compared against a character template for a match. Any approximation usually results in an incorrect character transmission to the host. Since more than 1,000 characters appear on a page, the tolerance for error must be very low (the industry standard is 1 in 300,000).

Each character is digitized into a fixed-pixel frame, much like the character matrix found on a printer or video monitor. But while the IBM-PC monochrome monitor resolves each character into a 9 x 13 pixel frame, OCRs use a frame with twice the resolution, typically 24x 32 pixels per frame. Since OCRs use fixed-pixel frames, character reading is monospaced. Template-matching systems cannot read true proportionally spaced characters and script, italic, and most boldface types. As a result, most OCRs cannot read books, newspapers, or similar typeset material.

Although OCRs scan one line at a time, most template matching is

done one character at a time. Each digitized character is isolated and checked against the character templates stored in a PROM on the OCR. The character templates use the same pixel frame as the scanned characters and compare part of the character before deciding that a match has been made.

Depending on the complexity of the system, the operator may be alerted when a single character is unreadable or only if a certain percentage of a page is considered unreadable. OCRs can store several templates on line, although most cannot check more than one typeface per line at once.

Successful character matches are converted into ASCII text code that can be transferred to a host computer system. Many OCRs can also transmit such formatting codes as underlining, indents, tabs, paragraph markers, and returns. The most common data transmission format is asynchronous serial, using an RS-232 port, although most models offer bisynchronous transmission as well.

Although the midpriced OCRs have much in common, they have a number of differences. Before buying, you should know what typefaces an OCR can read and test it with the typefaces most often used in your office. For example, most OCRs claim to read the common Courier 10 face, which sounds great until you realize that there are almost as many versions of Courier 10 as there are printer and typewriter manufacturers. Since typefaces are never generic, you should test real-world samples on your OCR instead of using a demo specially prepared by the manufacturer. Under ideal conditions, all OCRs perform extraordinarily well; under day-to-day office conditions, they may not work as well.

Surprisingly, most OCRs cannot read dot matrix print. The dots used to create the printed characters produce a fuzzy image that most systems cannot successfully digitize. Nor can they read poor photocopies and originals. Clogged type, in which the inner spaces of a letter are filled, is also unreadable. Some OCRs will reject pages with too many corrections scrawled on them; others will simply skip over the unreadable characters.

OCRs can scan only visible ASCII characters. No readable formatting codes for text, such as indents, tabs, line endings, word wraps, and paragraph markers, exist on the page. OCRs can interpret white spaces and generate default codes, but the results are unsatisfactory. For example, if an OCR generates a carriage return for all line endings, reformatting will be a chore; you must go to the trouble of editing out carriage returns and replacing them with word-wraps or "soft returns." Reformatting tables and columnar matter can entail even more work.

A partial solution for owners of dedicated word processing systems is using a format-processing PROM containing system-specific format codes. But these can cost over $1,000--assuming the OCR manufacturer makes PROMs for your system's software--and if you communicate with more than one dedicated system, you need more than one PROM. Most manufacturers do not even offer format processors for the PC, which would require different ones for each program.

These machines' manufacturers, to their credit, are careful never to make exaggerated claims about their systems' capabilities. Since OCRs are just now coming into vogue, they start out with a large amount of goodwill from consumers and critics. Their manufacturers seem

painfully aware of this fact and unwilling to squander that goodwill in the name of the bottom line. They recognize that their products will be used by inexperienced operators in a diverse market, where one or two service calls can be grounds for divorce.

THE DEST 211

Like many writers, I have hundreds of pages of precomputer-typed manuscripts sitting in file drawers waiting to step into the 21st century. When I found out that the DEST WorkLess Station, Model 211, OCR was on its way, I wasted no time hauling out all those old files, and arranging them in order of importance, with my own attempt at the Great American Novel right on top.

The DEST 211 arrived a day later, outfitted with the Typepak 2 PROM, which allows it to read three type styles: Courier 10, Prestige Elite, and Letter Gothic. Since my novel was written on an old Olympia with Modern Congress Pica type, the DEST could not scan it. (I doubt any other OCR, save the Kurzweil, could either; the novel will have to wait.)

With only slight disappointment, I gathered some samples printed with Courier 10, unpacked the 211, set it on my desk, plugged it in, connected it to my PC, loaded my Perfect Link communications software, and turned the 211 on. The whole process took 5 minutes, 3 of which were devoted to cutting the box open and removing the package.

The DEST 211 really is that easy to use. I have installed and fussed with mice, modems, and assorted printers and struggled with serial interfaces and translation tables for typesetting systems. None of them was as easy to set up as the DEST 211. You don't even need the manual that comes with it. It has only three buttons--On/Off, Read, and Clear--and two connectors on the back, one for the power cord and one for the RS-232 cable.

When you turn on the DEST, it performs a self-test that checks the OCR's system and verifies that your PC has a communications program loaded and ready to receive data. The DEST 211 comes with an asynchronous serial interface that supports the X-on/X-off, ECHOPLEX, and Simplex protocols. Although it supports baud rates up to 9600, I was unable to use higher than 2400 on my system. The DEST 211 also has a bisynchronous interface; however, I was unable to test it.

If you have not loaded a communications program, the DEST 211 displays an error message, "Check WPcom," during the self-test. Loading communications software and pressing the Clear button on the DEST clears the error, and you're ready to start scanning. DEST cannot check to see if you have opened an ASCII text file to receive data until after it scans a page and starts sending the data to your system. If you forgot to open a text or log file in your communications software, DEST displays another error message, "Waiting for WP." Opening a text file during the scanning process lets the data stream in, but you may lose the first few lines. In general, the DEST scans and outputs one full page every 25 seconds without your intervention.

Feeding pages into the DEST 211 is simply a matter of stacking them face up on the upper bin and pressing the Read button. Each page is slowly fed into the DEST, and after the scanning element reads a page, the machine deposits it on its lower bed. The upper bin holds up to 75 pages and accommodates paper from 6 to 8½ inches in width, and up to 14 inches in length.

The DEST 211 has a spring-loaded clamshell housing that pulls forward, revealing the scanning window and the paper feed drum. You can simply open the housing to remove any jammed pages. The clamshell housing also makes it easy to clean the scanning window.

The DEST 211 sends a page image directly to the host. Although you will have to reformat paragraphs, the machine did seem to recognize tabular matter, and you'll have no trouble getting the ASCII text files into shape. I used several editors, including EDLIN, Perfect Writer, PC-Write, and WordStar, and could format and print all my text files without any problem.

DEST does offer optional format processor firmware for a variety of dedicated word processing systems. The Model 4125, its universal, or generic, forms processor, can be used with the PC but is of limited usefulness. The company also offers many PROMs that contain specific formatters for IBM, Digital, Wang, Lanier, Xerox, and Hewlett-Packard word processors. Using this firmware, the OCR converts ASCII codes for character spaces, paragraphs, tabs, boldfacing, underlining, centering, floating hyphens, and so forth into the appropriate code for each system.

As each page is scanned and the characters are matched, data flows into the text file on your system--as long as the DEST is scanning

characters it recognizes. When it encounters a typeface it does not know, it will attempt to read the page anyway, looking for a possible match. Usually it will quit about halfway through and display the error message "unreadable page" on the operator manual.

The DEST 211 reads both typewritten and letter-quality printed samples without a hitch. As expected, it cannot read dot matrix or typeset text. The more-expensive DEST 212 Multi-PS reportedly can read up to 12 styles with its Typepak 11 software, including 4 proportionally spaced daisywheel typefaces.

The DEST 211 does well even with documents it acknowledges may be troublesome: you have to work hard to get an error. The machine performed so flawlessly on documents with the right typeface that I delighted in watching it struggle over a page I knew it could not read. Really bad photocopies, pages that are covered with pen marks, or pages with smeared type will make the DEST balk.

Still, the range of type quality it does read is surprising. The DEST 211 uses digital filtering to clean up the small specks found on most photocopies. It also uses a context-matching algorithm to check itself. When scanning a group of characters that includes, for instance, a price like $11.00 and the word Illinois, it distinguishes a one (1) from an uppercase "eye" (I) by checking the context and making a match based on preceding characters. As a result, most test samples had no errors. I attribute the errors I did encounter solely to copy quality. The DEST 211 sends unreadable characters as an "at" sign (@). Using a spelling checker or word processing program, you can easily locate and correct the errors.

The DEST 211 manual is appropriately short--40 pages, including the section on format processing--and almost comprehensive. It covers all three buttons, the six error messages, and basic maintenance and gives tips on document quality. Yet not once in the first 20 pages does it even hint that the DEST 211 uses an RS-232 interface. The manual depicts the power switch, the fuse, the Read and Clear buttons, the paper trays, and the reading mechanism, but the only mention of that gold plug with 25 pins comes 20 pages later in the "Format Processor" section, as a hardware specification with the asynchronous and bisynchronous communications parameters.

The manual does not discuss pin assignments, nor how to use the cable the machine includes. Admittedly, the DEST 211 connected easily to my system, but if you have to make a null cable or cross any wires, you would have to call DEST to find out what the pin assignments might be. A simple one-page discussion of the RS-232 interface and pin assignments with a couple of pictures would be helpful, as would suggestions for host software.

The base price for the DEST 211 is $5,995. With a format processor at $1,495, and the TypePak 2 at $990, the total would be $8,480. The DEST 212, with a format processor and TypePak 11 (the full 11-font library), costs $12,980.

The DEST 211 is an everyday business machine, pure and simple; it looks like a photocopier and is about as easy to operate.

HENDRIX TR100

Hendrix Technologies, which makes the Hendrix TR100, has closely followed developments in commercial OCR technology. In 1973 the company, then called Hendrix Electronics, brought out its first model, the TR-1. It read only specially designed fonts like OCR-A and the European OCR-B. Successive design changes produced the TR-2 in 1978, which could read underlining. To expand the market for OCRs, Hendrix also developed a special Selectric typeball, called Hendrix OCR-B, for use in legal offices.

The Tr-3, introduced in 1980, read a number of standard typewriter faces, including Courier and Prestige. In 1983, cofounder Dr. Ernest Henrickson and current president Alton P. Tripp bought the company and changed both its name and its direction. The new company no longer builds its own OCRs. Instead, Hendrix has bought exclusive rights from a Japanese manufacturer to market its machine, dubbed the Hendrix TR100, in the U.S. But Hendrix has added an extra touch of Yankee ingenuity, which separates the TR100 from much of its competition.

Hendrix decided to add one more board that it had designed for the TR100: a programmable format processor. As it turns out, this board makes the TR100 unique among desktop OCRs.

Unlike most desktop machines, which use special system-specific PROMs for format processing, Hendrix's format processor uses an EEPROM (Electronically Erasable Programmable Read-Only Memory) that stores both communications parameters and formatting codes. You input information into the EEPROM on a "header sheet," nothing more than a plain piece of

paper with the ASCII formatting codes typed on it. The only restriction is that the header sheet must be typed in OCR-B, a universal OCR typeface. Once a header sheet is prepared, you feed it into the TR100, which scans the page and reads the parameters into the EEPROM. You can change communications parameters and format codes almost at will for virtually any computer system or word processing software. You must, however, know which ASCII codes your software uses for formatting commands.

A typical header sheet sends the TR100 parameters for the baud rate, word length, parity bit, stop bits, and handshaking used to communicate with a host. Asynchronous serial communication is standard. With an optional chip, you can add bisynchronous communications and send the TR100 bisynchronous parameters, including fixed or variable block, block size, number of lines per block, and a sign-on message to log on to a host mainframe.

The header sheets also can specify up to 30 different word processing parameters. Line spacing, tabbing, centering, underlining, spaces, and blank-line treatment can be specified for any word processing system. You can also indicate various hard-return codes for indented formats, columns, blank lines, and paragraph markers. This ability is particularly useful with tables or columnar matter that must be edited on the host. Instead of getting hard returns placed at the end of every line, you can define where you want them placed as the host receives the text.

You can define default parameters and write them to the EEPROM by simply adding a /W command to a header sheet. Parameters can then be changed as necessary by feeding in a new header sheet. When the TR100 powers down, or if it is reset, the default parameters remain in the

EEPROM for the next session. A new header sheet with a /W on it can overwrite these defaults at any time.

For example, you can prepare a default header sheet for an IBM PC running WordStar and another sheet for an IBM System 34. When you turn on the TR100, the WordStar default using asynchronous serial communications is installed. When you want to send text to the System 34, all you do is feed another header sheet that contains bisynchronous communication parameters and EBSEDIC format codes. After this session you can reset the TR100 and use the WordStar format processor again. If you understand ASCII character codes and have a grasp of communications, you could probably learn to create your own format sheets in a few hours, if you also know how your word processing system uses formatting codes.

The programmable formatting capability almost overshadows the TR100 itself, which is compact and well designed. It has a tilting feed tray that can handle up to 100 sheets. Pages are laid on the bin, which flips up and engages a feeding roller. A 2,048-photodiode array scans the first ½ inch of paper and determines the background value of white before scanning the text. Characters are scanned at the rate of 250 per second. The photodiode array reads a line at a time, with an error rate of 1 per 300,000 characters. Scanned pages are deposited in a bin beneath the scanning area.

The TR100 performs a self-test during power-up and can test itself at any time during a work session. Indicator lamps light during the self-test and remain lit to isolate the problem area if an error is detected. After the test, you can select output port A or B (asynchronous or optional bisynchronous) and "indent" or "image" format modes.

The image format mode transmits white space in the margins, lines, and between columns as discrete space values. The TR100 sends a page image, much like a grid, to the host system. With 10-pitch type, one space equals 1/10 of an inch. Since the image mode does not sense multiple heading levels, lines of indented text are treated as separate paragraphs. You would use this mode with most block text formats, such as letters, memos, and reports.

The indent mode, also known as the outline mode, can sense multiple indented heading levels and inserts hard carriage returns only when the heading level changes. It can also insert tab codes instead of individual spaces on indents. Unlike the image mode, the indent mode can round off leading white spaces to the nearest tab spacing used in the Format processor. For example, if a heading were indented 33 spaces, the TR100 would send four tab spaces (or 32 spaces) to the host if it were using an 8-space tab, dropping the remaining leading space.

Characters are scanned a line at a time, and each is isolated in an individual scanning frame. The TR100 uses what the company calls "matrix matching using the multiple similarity method." This phrase translates roughly as follows: instead of comparing every bit in a character matrix, the TR100 selects various parts of the matrix and uses an algorithm to make a match against known character matrixes. If a match isn't made, another part of the matrix is scanned, but 99% of all matches are made in the first pass.

Because each character is isolated in a frame on the digital circuit instead of the scanning head, the TR100 easily reads letter-quality and daisywheel proportional printing, but not typeset material. The

TR100 was able to read about half of the dot matrix sample I tested it on, and only the boldface typeset sample, but that's more than most desktop OCRs can do. Needless to say, the daisywheel-printed and typewritten samples scanned without a hitch.

The base price of the TR100, with the programmable format processor and one asynchronous serial interface, is $10,500. Six fonts come standard on the TR100: Courier 10, Prestige Elite, Hendrix/OCR-B, Pica, Courier 12, and Letter Gothic. Hendrix can also make up a new typeface-matching PROM for $5,000. This price seems a small one to pay if you have thousands of sheets to scan, particularly when you compare it with the cost of hiring an operator to enter the material.

The TR100 offers the widest range of output capabilities I've seen on any device to date. Hendrix has taken a perfectly good Japanese OCR and made it better. The format processor alone makes the TR100 one of the most innovative and practical desktop machines on the market.

TOTEC TO-5000B

Typical of its breed, the TOTEC TO-5000B OCR page reader is very much a "niche" product. It has very limited applications, and if they don't specifically suit your needs, it's probably not the machine for you. If you have to make ASCII files from typewritten documents that were produced in a typeface the TO-5000B can read, it will do the job admirably. On the other hand, the TO-5000B is expensive and requires operator supervision for occasional corrections at best, and for more

than occasional corrections if the typeface match is not absolutely exact. This OCR must read many documents before it pays back its cost.

At first sight, the TO-5000B is reasonably unobtrusive (belying its 80-pound heft), and it runs quietly. When fed with a stream of documents whose typefaces it knows perfectly and hooked to a word processor for whose formatting commands it has been set up, the TO-5000B performs flawlessly. (At the OCR systems demonstration, the unit was cabled into a dedicated word processor rather than to an IBM PC.) Its nominal reading speed of 300 smoothly and efficiently turns documents into ASCII disk files, either for editing or for transmission via modem.

Good Support Features

The TO-5000B list of support features is well conceived and impressive. Since no OCR can make sense of letterheads, you can set a dial on the unit to ignore a variable area at the top of the page. Similarly, to prevent reading errors, you can mask the impressive array of distinguished endorsers down the left edge of letters that ask you to contribute to causes. The unit accommodates regular 8½ x 11-inch, legal-size, and the intermediate-size paper commonly used in Europe and Japan. Documents to be read follow a short, straight-line path, minimizing the possibility of jamming. If a paper jam occurs, it takes only a second or two to clear it.

You can install up to six pushbutton-selected font PROMs in a single unit. These include Courier 10, Elite, Letter Gothic, OCR-A, OCR-B, Pica 10, Prestige Elite, Prestige Pica and Courier 12. (Additional fonts, beyond the first, cost $445, and you may order customized fonts at somewhat higher prices). One of the pushbutton switch positions,

Multi, electronically tries on the various installed font templates and selects the most suitable, with no apparent loss in reading speed. Various multiple-porting options are available for units used with several host systems.

Real-World Conditions

How well did the TO-5000B perform in an office, with a PC-XT and various types of documents? I used two different setups to check out the TO-5000B at PC Magazine. First, an OCR Systems installer and I connected it through an optional hardware/software package, PC Intelligent Software ($1,200), in a bisync configuration designed to use the MultiMate word processing package. In this arrangement the unit could duplicate the "page image" formatting, together with support for boldface and underlining, that I had seen earlier at the OCR Systems demonstration.

But most of the time, the TOTEC was connected to my normal async RS-232 Com2port. I used CrossTalk, which supports the required X-on/X-off protocol and XyWrite II-Plus, the word processing program used at PC. I had to format the transmitted files manually but that was of no consequence for a brief test. In operation the TO-5000B reads an entire page into a memory buffer, and then the information is dumped to the host computer. While I used 2,400 baud mostly, I did successfully try 9,600 baud for a number of files, with no apparent ill effects.

Using the TO-5000B's sample materials, both the IBM Selectric Courier 72 and the Prestige Pica fonts transmitted several pages with only a single, apparently random error--an 6 was printed as an exclamation mark (!), the default error symbol. Using the Courier 12 element

at 10 pitch (pica) spacing produced on my own Selectric worked equally well. Two errors (a *g* became a 9 and an ¿ was printed as an error sign) occurred when the Courier 12 font was reduced to 12-pitch (elite). With Prestige Elite, similar 10- and 12-pitch checks yielded only one error: an underlining mark (_) became a hyphen (-).

A Tougher Challenge

Other materials, however, provided a tougher challenge. Documents you might wish to turn into ASCII files often originate outside your office because if you know you'll need a document in this form, when you prepare it yourself, you'll do it on a word processor. So I tried getting the TO-5000B to read a number of the breathlessly important press releases with which PC Magazine is inundated daily. Using what I took to be normal-looking typefaces, I typically got about one error every 90 characters. Some of these consisted of mistakenly substituted characters; the others were marked unreadable. Furthermore, the Courier font on my NEC Spinwriter (which is used for most of the program listings that are photoreproduced in PC) caused various random errors. For instance, it frequently, though not consistently, substituted 0 (zero) for O (capital "oh"). Almost as a joke, I ran some dot matrix printing through the machine and was surprised to find that while the draft quality was sufficiently readable and easily correctable, the letter quality of the same (Orator) type style caused even the patient TO-5000B to balk.

On the other hand, I found that wrinkled documents, visibly dirty photocopies, yellow marker highlighting, ball pen underlining (without touching the letters), and typing mistakes corrected with White Out

caused the TO-5000B no trouble. As you would expect, drawing a black line diagonally across the typeset of a document produces plenty of errors.

A Caveat

The TO-5000B should not be faulted for its every failure because I suspect that other mid-priced OCRs would give no better results. But prospective buyers should be wary of the limitations of today's state-of-the-art OCRs. They are not the DP equivalent of photocopiers, whose output, if readable, need never be proofread and corrected. Rather, if your need to rekey existing documents justifies using a mid-range OCR such as the TOTEC 5000B, you should order an optional, customized type font (if necessary) and integrate it with a formatting word processor. And, of course, you have to plan on having an operator on hand to catch and correct predictable errors, especially when dealing with material that originates outside the office. With an open-eyed approach, the TO-5000B should give you long and trouble-free service.

DEST Workless Station
Optical Character Reader

by Barry Scheur

PRODUCT: WorkLess Station
Model 211, 212A, 213A

SOURCE: DEST Corporation
1201 Cadillac Ct.
Milpitas, CA 95035
(408) 946-7100

PRICE: Model 211, $5995
Model 212A, $7995
Model 213A, $9995

REQUIRES: RS-232 port, communications software

THE DEST WORKLESS STATION

If you asked a dozen blind people what piece of equipment has the greatest impact on their professional or leisure-time activities, some might say speech synthesizers, others would choose paperless Braillers, while another group would opt for the Optacon. I would say, "the DEST—hands down."

The DEST is a medium-priced optical scanner that can read up to 12 different type fonts, depending on the model you buy. Its major limitation is that it cannot read typeset materials such as books, magazines, and newspapers.

The WorkLess Station comes in three models: the 211, 212A, and 213A. The primary difference between these—other than price—is speed and the number of type fonts each will accommodate. The 211 and 212A scan a page in up to 25 seconds, while the 213A scans a page every 15 seconds. All three models come with a Courier 10 type font. The 211

will accommodate two additional type fonts; the 212A and 213A will handle 2, 4, 7, or 11 different type fonts, which are sold in packages of these quantities. The Typepak 2 costs $990; the Typepak 4 is $1790; the Typepak 7 sells for $2690; and the Typepak 11 costs $3490.

An optional feature for the 212A and 213A is a format processor, $1495, which works in conjunction with the word processing program of your personal computer. This feature is essential if you want to produce documents similar in format to the original.

USING THE DEST WORKLESS STATION

I purchased a DEST just about a year ago, to be used in a law practice which literally drowns in paper. I still get excited every time I am able to take a contract that just arrived in the mail and turn it into braille in under 10 minutes (using either an Apple IIc or a VersaBraille). In addition, the DEST can be used as a "reading machine" like the Kurzweil Reading Machine by connecting it to a high-quality speech synthesizer such as DECtalk.

What makes this possible is that the DEST sends a page to a computer or speech synthesizer after it has read the entire page, rather than sending it line by line. By connecting the speech device to a tape recorder and using the pause control, you can actually produce listenable recordings of inkprint material.

To use the DEST, you simply stack the paper face up in the tray and push the button marked READ. You can stack up to 75 pages at a time. That's it—assuming, of course, that your computer is properly hooked up to the scanner. The machine will read through the pages

automatically, stacking them in the same order in which they were placed in the tray.

If a page is inserted upside down or backwards, the machine will either stop scanning or scan much too rapidly. Either way, these responses alert a blind user that something is amiss and that sighted assistance may be needed to rearrange the pages.

If the machine is unable to read a particular type font, or if the material has fuzzy characters the scanner can't decipher, it beeps and continues to beep every five seconds. You can force the scanner to keep reading the page by pressing the READ button. The only other button on the front of the machine is a CLEAR key, used when a page proves to be unreadable and you want to remove it from the scanner.

When the DEST is unable to read an individual character, it will either make its best guess or, more likely, will insert a "caret" symbol. This feature is useful because it allows you to guess what the missing or unrecognizable character is and, if you prefer, insert the correct letter. Although secretaries using the DEST with a word processor might find a 10% error rate objectionable, the luxury of being able to quickly and independently read a printed document more than compensates for the inconvenience of cleaning up the text.

As with any device, there are disadvantages. First, the DEST only comes with a serial port. If you or your employer plan to buy one as part of a work station, be sure the serial port is compatible with your computer.

Second, setting the DIP switches for baud rate, parity, etc., is difficult without sight. The top of the machine has to be removed.

Third, it has been difficult to use the DEST with a variety of machines having different communication requirements, such as connecting it to a VersaBraille and also wanting to use it with a WANG word processor. Both the "internal formatter chip" in the machine and the communications settings have to be changed every time—a job that takes about 15 minutes. In response to this problem, DEST has introduced a new dual-port option for $495. With this option, the DEST can be configured to have two format and configuration sets programmed independently.

Finally, there is no way to have the DEST System Messages, displayed by the machine, transmitted to the host device. This means that a blind person cannot know precisely why a particular interface may not work, except through trial and error.

All of these complaints are relatively minor. The scanner has enabled my secretary to translate documents first into a word processor, have them reformatted for braille, and then dumped to a paperless brailler or braille printer. In the right occupational setting, this peripheral can dramatically affect the speed with which you work.

COMMENTS & CONCLUSION

DEST offers tailor-made leasing agreements for 3, 4, and 5-year periods. Of all the scanners on the market, I am convinced that a DEST WorkLess Station, properly configured, offers an ideal combination of reliability, text reading quality, and simplicity that is hard to beat.

TOTEC TO-5000B
Optical Character Reader by Doug Wakefield

PRODUCT: TOTEC TO-5000B

SOURCE: TOTEC Co., Ltd.
OCR Systems (distributor)
One World Trade Center
New York, NY 10048
(212) 466-4667

PRICE: $8,990

REQUIRES: RS-232 port, communications software

THE TOTEC TO-5000B

The dream of having a machine that can read printed material arriving in the mail, or showing up in the office, is a dream shared by most of us without sight. So, when a new optical scanner appears on the market, hopes soar.

Actually, the TOTEC TO-5000B has been around for over two years; it gained prominence in this field when it was successfully interfaced with DECtalk, a high-quality speech synthesizer.

I wanted to evaluate this OCR as a possible addition to my product line. As the founder of Talking Computers Inc., a company which develops systems for visually impaired individuals, I was particularly interested in its application for the blind professional.

USING THE TOTEC OCR

I have run the TOTEC connected to an IBM PC and a Compaq. In both cases, I used Crosstalk, a communications package from Microstuf, to

interface the equipment.

The TOTEC looks like a table top copier. The paper is fed into the front of the machine, under a raised section that looks like a model of a highway overpass. Contained in the raised area are the rollers and scanning window that actually move and read the documents. The paper comes out the back of the machine and settles into a tray.

The reading process takes about fifteen seconds for a full sheet of typewritten material. If there is a problem, you simply raise the top cover and remove the paper. Opening this cover while the machine is reading does not harm the process. This means you can easily stop the reading process if you find you have placed a page upside down or backwards, or if the machine starts to jam.

If you have a talking program hooked up to the reading machine at the same time, and the paper is not feeding correctly, you will hear strange characters that make no sense.

One of the features mentioned in the reprinted article on scanners is the ability to reset reading margins; both the top and left margins can be changed. This can cause a problem for a blind operator. While using the machine, I suddenly realized I wasn't getting the beginning of each line. Someone had moved the little wheel that set the margin. This setting does not return to a default when the machine is shut off. This means that if you set the margins incorrectly, you must have someone who can read the small numbers on the dial reset them.

This machine tries hard to read anything you give it. I ran the machine on multifont all the time and had good luck. I tried a variety of materials and found that it can handle photocopied documents, letters

written by my folks on an old typewriter, and almost anything from a letter quality printer. The TOTEC can accomodate up to 12 different type fonts, each costing $445.

COMMENTS & CONCLUSIONS

Do I think the TOTEC is useful? Yes. After all, isn't reading a document with some errors better than not reading it at all? On the other hand, it depends on the kinds of materials you need to scan. None of the scanners in this price range can handle typeset materials.

The TOTEC comes equipped with one format processor, but you can add two more for $995. This means that the TOTEC can be used by both sighted and blind workers in the same office. For example, a blind secretary can connect her PC to a TOTEC. Her co-workers can submit their drafts into the optical scanner for her editing and corrections. The same TOTEC can be connected to a WANG word processor and can scan documents from other offices or those produced on the PC and printed out into the WANG. The TOTEC can be a vital link between several incompatible systems.

But it isn't cheap, costing up to $12,000 if you add all the options. However, the return on investment looks more impressive when it is used in an office setting where others can benefit from it as well.

THE OBERON OMNI-READER: RECOGNITION BECOMES AFFORDABLE

by Winn L. Rosch

(Reprinted from PC Magazine, July 9, 1985. Copyright © 1985 Ziff-Davis Publishing Co.)

Unless you chew through reams of paper faster than a chainsaw, an optical character reader is generally an unbudgetable expense. It's hard to justify paying upwards of $5,000 if you have only an occasional need to automatically enter typed text into a format that is readable by your PC.

The Oberon Omni-Reader breaks through that price barrier. At about $500, it's by far the cheapest optical character recognition device you can attach to your PC. Yet, after that minimal expense and about 10 minutes of installation, you'll have the benefits of optical character recognition. Your PC will be able to directly read typewritten text into your favorite word processing program with little more effort than a wave of your hand--literally.

The Electronic Clipboard

The Omni-Reader isn't priced like a typical OCR, nor does it look much like one. The whole machine is built around a big, thick wedge of plastic that resembles nothing so much as an electrified, overweight clipboard without the clip on the top. At the top edge of what would be the writing surface of the clipboard is a row of LED indicators. At the left is a shiny steel tube that serves as the track for a movable plastic slider.

A mostly clear plastic ruler with a long slot in its middle clips onto this slider and serves as the track for the scanner itself. The scanner is a graspable chunk of charcoal-colored plastic about the size of a PCjr game cartridge, but adorned with a single LED on top and a rocker switch on one of its narrower sides.

Inside the clipboard are the brains of the system, a top-quality, glass-epoxy printed circuit board bedecked with a microprocessor, a big, custom, Large Scale Integration (LSI)chip, three big ROM chips, and a handful of discrete-logic ICs and transistors. To keep interference from escaping the plastic case, the electronics are sandwiched between two steel plates that also serve as a ground for all connections to the outside world.

The Omni-Reader connects to your PC by an RS-232 jack on the top side of the "clipboard." Electronically, the machine acts like a one-way modem and requires a "straight-through" cable when used with a PC. Power and the scanner itself are also tethered to jacks on the clipboard top by their own thin cables. Two DIP switches, one each to adjust the RS-232 speed and the few scanning options, are also on the top side.

To operate the Omni-Reader, you must first manually lay each sheet to be scanned on the clipboard. In theory, the sheet is held in place by two tacky strips running the length of the board. Next, you position the ruler over the text so that a single line shows through the slot in the ruler. Finally, press down the rocker switch on the scanner and move it in a single, broad sweep across the full line of type. With some luck and skill, the same text characters should appear on the screen of your PC a few seconds later.

Do-It-Yourself Savings

The key to the Omni-Reader's low cost is that the machine makes you do the expensive part of the work--moving the scanner around. While other OCRs use elaborate combinations of belts, pulleys, cams, and cogs to pull paper past a scanner and move the scanner past each character, the Omni-Reader puts your hand to work pushing the optical scanner along its plastic guide track. Using the Omni-Reader is akin to the first step in speed-reading--whisking your finger past each word of the text.

Making this manual, minimal-expense system workable involved the synthesis of a lot of clever technology. Instead of getting its optical impulses from the smooth, predictable scanning of a machine, the Omni-Reader must cope with the vagaries of human muscle. Compared to a precision machine's work, the wave of your hand is a big variable; the effective scanning rate changes with each imperceptible speed variation you make in your sweep across the page.

The Omni-Reader copes with such variations admirably. Just as long as you don't move the scanner too quickly for the device to access the data you're inputting, the Omni-Reader can buffer your humanness into digital perfection. In fact, the Omni-Reader is smart enough to sort things out into normal English if you scan from right to left instead of the standard direction.

The secret to the Omni-Reader's smarts is a timing track, which consists of a series of markings on the bottom perimeter of the slot in its rule-cum-guide track. The fixed pattern of dashes encoded into the timing marks supplies the Omni-Reader with a frame of reference for judging the speed, and hence the relative reading position of the scanner.

Take the scanner out of its track and it won't read anything.

Fortunately, the scanning track is easily detached from the clipboard so you can lay it on bound manuscripts or other objects too big to fit. Further, Oberon offers an optional, larger rule to track the scanner across documents that are too wide to fit on the clipboard.

Easy Installation

Installing the Omni-Reader hardware is merely a matter of making a few not-so-difficult connections. You run a standard serial cable from an asynchronous port on your PC to the female DB-25 jack on the Omni-Reader and plug the scanning device into the clipboard. You then plug the big auxiliary transformer into a wall outlet and its thin umbilical cable into the clipboard.

Clever software, including a special device driver program, integrates the Omni-Reader into your system as an input device. It requires no additional communications software. When properly set up to communicate with your word processor, the Omni-Reader acts like a supplementary keyboard, sending the characters it reads directly into the text editor as if they had been typed.

Installing the software may be the only tricky part of the setup process. You must add two new entries--DEVICE=ANSI.SYS and DEVICE=OMNI.COM--to the CONFIG.SYS file on your boot disk or copy the CONFIG file supplied by Oberon on its software distribution disk. Then you must ensure that the two files with the names you've added to the CONFIG.SYS file are also present on the boot disk.

Next you must tell the software the communications parameters you've already set on the Omni-Reader's DIP switches by running a menu-driven program (with useful on-line help) called OMNICON.EXE. Using this program, you select baud rate, the serial port to which you choose to attach the Omni-Reader, and translations of any specific strings that the Omni-Reader sends to your PC--that is, you can specify character sequences that the Omni-Reader will later translate into commands or other strings of characters. With this information, the OMNICON.EXE program creates a configuration file, which is written to disk and must be present on whatever disk you use to put the Omni-Reader into operation.

To start using the Omni-Reader, you must type the command OMNICON followed by the name of the configuration file you've made, then the name of whatever application program you want to send the characters to. Typically you would interface the Omni-Reader with your favorite word processor. Conveniently for old stalwarts like me, Oberon includes complete instructions on how to write a batch file that makes using the Omni-Reader with WordStar as easy as typing RUN-WS.

Smart Reading

Once you get the hang of scanning, the Omni-Reader is simplicity itself to use. Just press the downside of the rocker switch on the scanner before you start to read a line and release it when you're finished. The Omni-Reader pays no attention at all to large blank spaces at the ends of text lines, indents, and other such aspects of page formatting. It merely sends each character it recognizes directly to your word processor (or other program) as if you had sat down and typed

them in at the keyboard. Through the configuration program, you can set the Omni-Reader to send carriage returns to your word processor by recognizing either text symbols or a press on the reset side of the scanner's rocker switch.

The Oberon engineers seem dedicated to freeing you from the keyboard. In order to issue commands to the Omni-Reader, you don't type them--you scan them. Several special Omni-Reader instructions are printed on the clipboard itself, such as the one that selects from among the fonts that the Omni-Reader will recognize. Other commands are printed in the spiral-bound instruction manual--to send them to the reader, just flop the book down on the clipboard and scan the printing.

Practice Makes Almost Perfect

As freewheeling as using the Omni-Reader sounds, you can't just go ahead and scan lines in any old way you please. You must whisk the scanner across its rule within a period of ½ to 3 seconds. If you go too fast, all the LEDs in the world seem to flash at you, and the Omni-Reader repeatedly beeps to scold you into slowing down. In order to put a stop to the fireworks, just press the reset button and try again. If you go too slow, you add to the error rate--if the Omni-Reader recognizes any characters at all.

If the Omni-Reader is successful in identifying each character on the line you scan (correctly or not!), it beeps in affirmation (after a brief processing delay). If it has trouble recognizing some of the characters, it beeps twice and gives you a chance to cancel the reading of that line (by pressing the reset button) or accept the possibly erroneous text (by continuing on to the next line).

Explaining how to use the Omni-Reader is more complex than actually using it. The proper scanning procedure is not difficult to learn: you have only one rocker switch (with two positions) to press. But, like anything else you do with your hands, using the Omni-Reader is a skill that develops with practice. The more you use the Omni-Reader, the better it works and the fewer errors you get because you learn how to move the scanner more smoothly and with a closer approximation of its ideal speed.

One of the trade-offs Oberon made to bring the Omni-Reader's price down involved the number of fonts it will recognize. It knows only four: Courier 10, Courier 12, Letter Gothic, and Prestige Elite. More fonts can be downloaded from your PC into the Omni-Reader's memory (although Oberon didn't send me any downloadable fonts to test). The manual indicates that future versions of the software will enable you to teach new fonts to the Omni-Reader yourself.

The Omni-Reader is not capable of automatically sorting out different fonts; to minimize errors you must choose the correct font. To aid you in making the right call, Oberon supplies a clear plastic sheet on which are printed selected letters from each font the machine recognizes. You can easily match fonts by laying the plastic sheet over a sample of the text you want to read.

The biggest sacrifice you make for the low price of the Omni-Reader appears to be accuracy. The only material I was able to get the Omni-Reader to recognize without any error at all was Oberon's sample text. Letter Gothic and Elite text that other, more-expensive OCR machines had recognized flawlessly resulted in one or more errors per

line, even when the Omni-Reader's beeper indicated that the text had been deciphered and that all was well.

Unlike more complex machines, however, the Omni-Reader's error rate did not increase by any great measure with photostatic copies or good-quality offset copies, and it even made an effort at reading carbon copies, although the results were somewhat less accurate. For the most part the machine ignores interlineations, editing marks if done in blue pencil, and even colored paper. Further, the Omni-Reader will handle nearly any kind of paper without complaint, because its manual paper-feeding mechanism necessarily treats each sheet humanely.

Compared with the desktop OCRs that are currently available, the Omni-Reader is slow. To read each line, you must properly position the guide rail--which can be tricky with single-spaced text--before dragging the scanner across it at the Omni-Reader's desired speed. Then the Omni-Reader requires that you wait until it deciphers one string of characters before you burden its mind with another set. If you try to press it for higher performance by starting to read the next line before it beeps its readiness, you'll lost text. Hence, the recognition rate of the machine sets its maximum speed at between 5 and 10 seconds per line. A single page of double-spaced text takes several minutes to scan completely. Since that's much faster than most people can type, the result is a more-efficient transcription of printed text.

The Omni-Reader is useful for making drafts but unacceptable if you plan on translating hard copy into finished electronic form without proofreading. Because of the wait between each line, it can be tedious to use. But if you have to get text into electronic form and you don't

want to mortgage your house and sell the kids to buy a full-scale OCR, the Omni-Reader is not just your best alternative, it may be the only one.

Omni-Reader
Optical Character Reader

by Dick Gage

PRODUCT: Omni-Reader

SOURCE: Oberon International
600 E. Las Colinas Blvd.
Suite 1002
Irving, TX 75039
(800) 262-3766

PRICE: $495

REQUIRES: Asynchronous communications adapter.

The Omni-Reader is the lowest-priced optical character reader on the market today. That's the good news. The bad news is that it was, obviously, designed for sighted users. The user must guide a wand over a printed line, similar to the process of moving an Optacon over text, except there is no tactile feedback to tell you whether you have deviated from the line. A sighted user need only look. Plus, the routine has a built-in speed factor. If you move the wand too fast, the device gives off a beep, and it may mean that you have lost data. You must try again. For all users, learning to control the speed improves with practice.

DOES IT WORK?

I borrowed an Omni-Reader for two weeks. It soon became apparent that tracking posed a problem, so I experimented with several different approaches to the problem of staying on track.

First, I tried to fasten my Optacon camera to the wand. This proved unworkable. Next, I made a heavy cardboard template. Since most typewritten pages contain approximately 66 lines, and start about one inch from the top, I constructed a template corresponding to these specifications for an 8½ x 11-inch size paper.

I soon discovered that many documents do not conform to these dimensions--with respect to paper size, margins, or spacing between lines. To utilize this method would require a rather large library of templates.

But, for the sake of experimentation, I decided to produce a workable model that met the above specifications. I taped the paper to my template and started to scan a line. Bravo. I was able to scan a few words--but very slowly.

FINAL COMMENTS

In the final analysis, this optical character reader did not perform adequately for me as a blind operator. This is not to say that under very strict conditions, where format can be controlled, this OCR could not be used by a blind operator. But reality dictates that very few printed materials can be so carefully defined.

I spoke with the folks at Oberon and they expressed an interest in my application, although they admitted that the machine was not designed with this in mind. I would be very interested in talking with anyone who has found a practical way to utilize this fine and inexpensive OCR.

CHAPTER 2

A Buyer's Guide to Modems

IN SEARCH OF MODEM REVIEWS

What can you say about a modem that doesn't put an insomniac to sleep. Start talking direct-connect, stand-alone, 300/1200 baud, Bell 103 and 212A compatible, asynchronous, and — pretty soon — you find you're talking to yourself. There was a time, not long ago, when "duplex" was a simple word to describe the house where you lived, and "baud rate" could be mistaken for pulse.

But life got tough and the tough got modems.

The original idea was to include modem reviews in this book. Volunteer reviewers abounded: *"You need a modem review?" "Sure, no problem." "I'll drop it in the mail this week."*

Deadlines came; deadlines passed. Not a modem review could be found. The postman shook his weary head day after day, *"Sorry, lady, no modem reviews today."* The Editor's phone died from neglect. Summer faded away, and the empty folder marked "Modem Reviews" collected nothing more than a few autumn leaves.

But necessity is the mother of invention, and necessity dictated a trip to the local library in search of modem reviews. Armed with a year's worth of such notables as *BYTE*, *Popular Computing*, *PC Magazine*, and *Personal Computing*, the search began.

The discovery was enlightening: no modem reviews. Well, actually, one modem review, that was — with all apologies to the author — deadly.

The plain and simple truth is that modem reviews are boring. Modems either have certain features or they don't. What a potential buyer needs to know is what those features are, and then, which modems have them. The first article in this chapter will untangle some miserable modem jargon, and the accompanying chart will describe some popular modems and their features.

In spite of the uninteresting language which surrounds modems, some very exciting things can be done with them, as you will see in this chapter. The industry is just starting to grow, as is evidenced by the fact that practically every modem manufacturer I called had just moved to "larger quarters."

We did include two short pieces on the Hayes Smartmodem and the U.S. Robotic's "Password" modem. This was a gesture of goodwill in exchange for their support to blind consumers. Both companies subsidized the production of their respective manuals in braille, which are available from the National Braille Press. We think this deserves special recognition.

A BUYER'S GUIDE TO MODEMS: FROM BREAD & BUTTER TO CAVIAR

by Al Gayzagian

A modem is a device which enables you to send and receive information — to and from your computer — via the phone lines. In other words, a modem translates the signals generated by one computer into impulses which can be carried by telephone lines to another computer at the other end.

In addition to a computer, modem, and telephone line, you need communications software to make it all work together. In fact, some people would argue that purchasing the right communications software is more important than choosing a modem.

Modems come with a variety of features — features which determine its ultimate price tag. This article will discuss some of these features within three broad price ranges. This approach should help you choose a modem based on your particular needs and cash flow.

BREAD & BUTTER MODEMS

For less than $100, you can purchase a 300-baud modem, either of the acoustic coupled or direct connection variety, with both sending and answering capabilities. For those of you unfamiliar with this jargon, let me explain.

Three hundred baud refers to the speed at which data are transmitted. The formula is baud rate divided by ten equals characters per second. A 300-baud modem allows data to be transmitted at 30 characters

per second.

Sounds fast, right? Well, yes and no. When you first begin to work with data transmissions and compare the transmission speed with your own typing speed, 30 characters per second does seem fast. However, if you are paying for connect time on a database, you may find 300 baud too slow for your pocketbook. But more on that later. If your plans are modest, a 300-baud modem is adequate and inexpensive.

What about the terms "acoustic coupled" and "direct connection"? Because this is becoming less of an issue, I will dispense with it quickly.

An "acoustic coupled" modem is one with rubber cups into which you fit your telephone handset. Data travels from the computer into the modem, and then into the telephone handset and over the phone lines to a remote computer. Its only advantage is that it can be used where, due to a multiple-line situation, a telephone jack isn't available. But even this advantage disappears if you decide to have a jack installed on your phone.

Among its disadvantages are more line noise and other outside interference which can wreak havoc with incoming and outgoing signals. In an effort to reduce such transmission errors, most acoustic modems are limited to relatively slow (under 300 baud) speeds. Another little problem is that phones now come in a variety of shapes--not necessarily round--and may not fit into the circular rubber cups of the acoustic modem.

A "direct connection" modem, as its name implies, connects directly to your telephone jack or telephone. The direct connection eliminates

the problem of noise contamination and muddled communication. Direct connect modems can easily handle transmission speeds to 1200 baud and beyond.

Another feature to consider is "answering and sending capabilities." There are some modems on the market which allow you to initiate a call to another computer, but not to receive one initiated by a remote computer. You will want a modem that can do both, even if you think you won't be receiving calls from another computer. As you get more involved in data communication, you will find yourself dealing with systems which operate on the don't-call-us-we'll-call-you-principle, or you may want to link up with someone who can only initiate calls.

Purchasing one of these bread-and-butter modems is a good way to get started in telecommunications. These modems work well with your computer and with such terminals as the VersaBraille. They will give you access to most databases with a relatively small initial outlay.

But, perhaps, you prefer a little jam with your bread...

PLEASE PASS THE SMUCKERS

You may find the 300-baud transmission speed, which seemed so fast at first, to be less than satisfactory when taking off or downloading long files. If so, you will be interested in a modem that offers 1200-baud capability, transmitting four times as fast as 300 baud. Many of the outside databases charge you twice the hourly rate when using a 1200- versus 300-baud modem, so you can save quite a bit of money.

On the other hand, if you are working interactively or conversationally with another computer, you will probably revert to the slower

speed. There is no reason to pay the higher hourly rate without the corresponding benefit of faster transmission. There are modems in the $200-$300 price range that offer both 300- and 1200-baud operation. A few modems with 2400 baud are appearing on the market, but there are very few databases which are compatible with them. Besides, 2400-baud modems fall well outside the price range we are discussing.

Another choice you must make in the middle-price range is between a stand-alone unit or a plug-in card. The plug-in card is exactly what it says it is: a card that plugs into one of your computer's slots. The plug-in card can be designed by the computer or modem manufacturer to take full advantage of a specific computer's capabilities. Because such modem cards are designed for specific computers, their manufacturers can bundle compatible communications software with their products. Another advantage of the plug-in card is that it enables you to transport your system more easily and does not take up valuable desk space.

Its major drawback is that it becomes obsolete if you upgrade to another system. If you decide to buy a new computer or use your modem with someone else's computer, you can do so with a stand-alone unit but not with a plug-in card.

A stand-alone modem is an external unit that sits on the desk top and is connected to a communications port on the computer. Some computers come with a built-in port while others, like the IBM PC and the Apple IIe, do not. So if you have an IBM PC or a IIe, you will have to buy an expansion board to get the extra port. For a 300-baud modem, the expansion board plus cable will cost you about $300; for 1200-baud modems, you will pay $600.

Unless you plan to stay with your present computer system for a long time, and don't intend to use your modem with more than one piece of equipment, you should probably opt for a stand-alone unit. I have found it very convenient to use the same modem with an Apple, a Versa-Braille, and an IBM XT--something I would not be able to do with a plug-in card.

One of the most attractive features available in the $200-$300 price range is the so-called "smart modem" capability. This capability, combined with the appropriate communications software, allows you to do such things as:

- Dial automatically from your computer keyboard;
- Use stored phone numbers which can be called up with a few keystrokes;
- Set your system to answer automatically at a specified time;
- Provide automatic log on capabilities, *i.e.*, the ability to store and run programs which will log you onto systems and issue a series of commands needed to access specific data and, if you like, to log off.

The Anchor Signalman XII is a good example of this kind of modem. In many ways, it is a clone of the popular Hayes Smartmodem which we will discuss later. It does, however, lack a few features which you may find important enough to warrant the higher price of a Hayes. Most smart modems on the market have incorporated the various Hayes command protocols which have become a de facto industry standard.

A brief word about a few numbers associated with modems: Bell 212A for 300- and 1200-baud modems, and Bell 103 for 300 baud. Modems that are made in the United States are primarily modems that use the protocols established by the modems manufactured by Western Electric for AT&T. The rest of the world uses something else. You will want a

modem with Ma Bell protocols which have become the standard in this country.

CAVIAR, NOT SMUCKERS!

You can get a lot of useful modem features in the mid-price range, so why pay more? For one thing, you might want some of the features you can get with the Hayes Smartmodem, not included with such semiclones as the Anchor Signalman XII. Blind users, in particular, might like the speaker that comes with the Hayes Smartmodem. If you are downloading a long file with your speech synthesizer turned off, it is useful to monitor the sounds from the speaker to indicate when the download has ended or stopped for some other reason. There are other ways of getting this information, such as tuning an FM radio near channel 6, but the Hayes speaker is convenient.

You may be interested to know that most or all smartmodems can actually be used without a telephone. They only need a phone jack. In fact, unless you have a separate jack installed on your phone, you have to disconnect the Hayes in order to use your phone, since the Hayes has only one jack. The Signalman has two, meaning that you can keep both your phone and your modem active simultaneously.

Probably the most significant bonus you get for your extra dollars is metal construction instead of plastic, and the ability to use more sophisticated communications programs.

COMMENTS & CONCLUSION

While I have tried to segment modems into three broad price groups, the reality is that both prices and features operate as part of a continuum. Another fact is that modem prices have fallen substantially over the past two years. You may find, if you shop around, multi-featured modems that sell for substantially less than I have suggested.

In essence, the choices you need to make are baud rate, plug-in versus stand-alone, smart versus regular, send/only versus send/answer, acoustic coupled versus direct connection, and speaker versus nonspeaker.

I want to emphasize that you should not deprive yourself of the world of telecommunications because you can't have one of the more expensive models. You can manage well with one of the less expensive models which will open up a wide variety of databases and bulletin boards.

If you are using a computer rather than a terminal, you will need a communication program. While some off-the-shelf communications programs work with speech, others do not. Some popular ones being used with speech are the Talking Termexec and Talking Transcend for the Apple IIe, and PC Talk and Crosstalk with the IBM PC. In some cases, you will spend more for communications software than for the modem and you won't get all the benefits offered by some of this software without a more expensive modem.

In the final analysis, it is better to get started with what you can than not at all. There's a whole new world out there waiting for your signal.

U.S. Robotics "Password" Modem by Barry Scheur

PRODUCT: "Password" Smartmodem

SOURCE: U.S. Robotics Inc.
8100 N. McCormick Blvd.
Skokie, IL 60076
(800) 342-5877

PRICE: $449

A PORTABLE, AFFORDABLE MODEM

The U.S. Robotics "Password" Smartmodem is a Hayes-compatible modem and is designed to work with a variety of microcomputers. It is easy to operate, portable, and affordable.

The "Password" is small by modem standards—about the size of a paperback book. It comes with a cable attached and ending in a male plug. The modem itself has only one switch, ON/OFF, which is located on the rear panel.

The four recessed DIP switches are also located on the rear panel and are, unfortunately, accessible only with a screwdriver.

My experience with the U.S. Robotics Customer Support team has earned them the title of "most helpful computer people anywhere." I often use the modem in conjunction with the Apple IIe and VersaBraille. The VersaBraille originally had some problems with log-on sequences (this problem has been fixed in newer models), which caused a problem working with the modem. The Customer Support staff spent several hours on the phone helping me solve the problem. Their assistance was first-rate.

8-1

This modem represents an excellent value in a 300/1200-baud unit. The only possible disadvantage of this modem stems partly from its small size. It has a tendency to "heat up" if left on for several hours or more. The manufacturer has informed me that this "heating up" will not cause any damage to the unit.

My last comment speaks again to the attitude of the company. U.S. Robotics *initiated* a call to National Braille Press to underwrite the cost of producing their manual in braille. This means that a user may receive a braille copy from the Press at no charge. Now that's what I call customer support.

PRODUCT: Hayes Smartmodem 1200

SOURCE: Hayes Microcomputer Products Inc.
705 Westech Drive
Norcross, GA 30092
(404) 441-1617

PRICE: $599

A SMARTMODEM THAT LIVES UP TO ITS NAME

The Hayes Smartmodem 1200 is a direct-connect, stand-alone, 300/1200 baud, Bell 103- and 212A-compatible modem which has become an industry standard. All that means, in simple English, is that the Hayes Smartmodem offers you everything you could possible want from a modem.

This Smartmodem knows a lot of tricks: it can originate or answer calls; it can call originate-only modems; it can link directly with another modem in a network configuration; it can link to an amateur radio rig; and much more. The Hayes lets you modify the parameters either by changing the DIP switches, or by entering commands from the keyboard—as most of us will probably do.

You don't need to use the Hayes with a telephone; you only need a phone jack which you can have installed. In fact, unless you have a separate jack on your phone, you have to disconnect the Hayes in order to use your phone.

The Hayes comes with a speaker which can be useful for a blind person in tracking data transfer. The speaker can be killed whenever

you get tired of the annoying sound—and you will.

One particularly nice feature that Hayes offers isn't part of the unit at all. It is a well-written manual which is available in braille from the National Braille Press, thanks to a grant from Hayes.

If you want a modem that's easy-to-learn, easy-to-use, with lots of flexibility. If you want a modem that will greatly speed and simplify your telecommunications, with a proven track record—then you won't be disappointed with the Hayes.

It's only fair to add that other modems offer many of these features at a lower price, but Hayes has proven to be worth the difference.

MODEM COMPARISON CHART - BASIC FEATURES

The Modem Comparison Chart lists the following modem features from left to right: *Company/Product, Price, Interface, Baud Rate, Duplex, Dialing, Voice, and Bundled Software.*

Company Product: The manufacturer's addresses are listed separately at the back of the book.

Price: These prices were current at press time, but they will probably continue to drop.

Interface: This indicates the way the modem interfaces with your computer circuitry. The common RS-232 serial interface is compatible with almost every microcomputer. But there are several varieties of RS-232 interfaces, and you should check to be sure the one you choose is absolutely compatible with your system. Other interfaces are IBM PC-compatible or Apple-compatible.

Baud Rate: Baud rate measures the speed with which a modem can transmit or receive data.

Duplex: Modems operate in half-duplex mode, full-duplex mode, or both. Half-duplex modems will handle communications only in one direction at a time. With a full-duplex modem, you can communicate in both directions at once.

Dialing: This column tells you whether the modem will dial the phone for you. If it does, it also tells you whether the modem will accommodate the traditional circular dial phone or the touch-tone variety, or both.

Voice: This feature allows you to suspend data transfer so you can speak to someone at the other end of the phone. This is an important feature if you plan to talk with other people, as opposed to communicating with a database only. "Manual" indicates that the modem requires you to make the change manually. "Auto" means that the modem can make the switch automatically.

Bundled Software: Some modems come packaged with communications software which is listed in this column.

MODEM COMPARISON CHART*

Company/Product	Price	Interface	Baud	Duplex	Dialing	Voice	Bundled Software
ANCHOR AUTOMATION (Signalman)							
Volks Model 12	$299	RS-232	300/1200	both	both	manual	none
Express	$399	RS-232	300/1200	both	both	auto	none
Express 1	$349	IBM	300/1200	both	both	auto	Link
Lightening 24	$599	RS-232	312/2400	both	both	auto	none
DATEC							
Pal 212	$399	RS-232	300/1200	both	both	auto	none
Pal Plus	$499	IBM	300/1200	both	both	auto	Crosstalk XVI
HAYES							
Smartmodem 300	$199	RS-232	300	both	both	none	none
Micromodem IIe	$199	Apple	110/300	both	both	none	SmartCom I
Smartmodem 1200	$599	RS-232	300/1200	both	both	none	none
Smartmodem 1200B	$549	IBM	300/1200	both	both	manual	SmartCom II
NOVATION							
Cat (acoustic)	$189	RS-232	300	both	NA	none	none
J-Cat	$149	RS232/TTL	300	F	NA	none	none
D-Cat	$199	RS-232	300	both	NA	manual	none
Apple-Cat II (card)	$319	Apple	300/1200	both	both	manual	Mite 5.1A
Smart Cat Plus	$499	RS-232	300/1200	both	both	auto	none
Access 1-2-3	$595	IBM	300/1200	F	both	auto	Crosstalk XVI
212 Auto Cat	$695	RS-232	1200	F	both	auto	none
RADIO SHACK							
DCM 3	$ 60	RS-232	300	F	none	none	none
DCM 5	$130	RS-232	300	both	both	none	none
Acoustic Coupler	$120	RS-232	300	both	none	none	none
DC-2212	$400	RS-232	300/1200	both	both	none	none

Company/Product	Price	Interface	Baud	Duplex	Dialing	Voice	Bundled Software
U.S. ROBOTICS							
Password	$449	RS-232	1200	both	both	manual	none
Micro Link 1200	$499	IBM	1200	both	both	manual	Telepac
Micro Link M64	$619	IBM	1200	both	both	manual	Telepac
Micro Link M256	$839	IBM	1200	both	both	manual	Telepac/print
Auto Link 1200	$499	RS-232	1200	both	both	manual	none buffer
Auto Link 212A	$549	RS-232	1200	both	both	manual	none
Auto Dial 212A	$599	RS-232	1200	both	both	manual	none

* This chart contains just a few of the more popular modems.

CHAPTER 3

Braille Printers and Translators

THE BUMPY ROAD TO AFFORDABLE BRAILLE PRINTERS

by Barry Scheur & Olga Espinola

Many blind people dream of being able to produce braille copies of printed material quickly and independently. While computer access—through speech or braille output devices—provides a method of reading printed documents, the ability to translate and produce them in braille for distribution or permanent storage is only now beginning to be realized.

Until recently, the braille printers on the market were geared for large production braille facilities, both in terms of size and price. Over the past three years, three low-cost personal braille printers have been developed to meet individual needs for braille production. These are the Cranmer Modified Perkins Brailler (Perky) manufactured by Maryland Computer Services; the Personal Brailler produced by Triformation Braille Systems; and the MBOSS-1 made by VTEK.

These "first generation" braille printers do not compare, in terms of features and reliability, with inkprint printers on the market. But if your braille production needs are modest—roughly 200-400 pages a week—you will want to consider the three models reviewed in this article.

Several new braille printers are scheduled for release in 1986. The decision to buy now or wait is a difficult one left entirely to the reader's discretion.

A SUBJECTIVE REVIEW

This review is necessarily subjective; by that we mean that it is based on our own personal experiences with these three braille printers. Both of us own a "Perky" and the other two braille printers were loaned to us for a week or more for the purpose of this review.

A number of head-to-head comparisons of print speed, noise level, and ease of inserting the paper were carried out. While not scientific, we are comfortable that this review provides a basic comparison of these three units.

The review of the Perky is based on several years of experience; the other two reviews are based on just a short period of time. Therefore, long-term reliability and technical support concerns cannot be answered. Features which we consider important may not be important to you. Therefore, whenever possible, we suggest that you ask a sales representative to give you a demonstration before making a decision.

THE CRANMER MODIFIED PERKINS BRAILLER OR "PERKY"

The "Perky" was the first personal braille printer on the market. It resembles a Perkins Braillewriter with two exceptions: a large square base has been added to the bottom, and the front opening where the paper rolls has been closed. It is the smallest of the three braille printers, weighing about 22 pounds and only slightly larger than the traditional Perkins Braillewriter.

The Perky is both braille printer and similar to a stand-alone electronic braillewriter. This means that a user can produce braille in a similar fashion to producing braille on a manual Braillewriter.

Unlike the Perkins, however, there is no movable carriage, backspace key, paper advance key, or ability to set margins manually. All of these functions are handled through the keyboard using "chords" which are a combination of one or more braille characters struck simultaneously with the space bar.

The Perky can also produce braille graphics. A software package, called the Cranmer Brailler Graphics package for the Apple II family and sold by Raised Dot Computing, creates raised drawings and the duplication of printed graphics. The Cranmer can also be used interactively with a mainframe computer, computer database, or bulletin board system through the use of its keyboard.

Advantages

After three years of use, the Perky has proven to be fairly reliable. Early problems with solenoids appear to have been fixed. Where service has been needed, users feel it has been performed well with a good turn-around time. This can be extremely important if you are dependent on one machine for braille production.

A second major advantage of the Cranmer is the quality of its braille—the dots are clean and crisp. The braille has the "Perkins" feel that many blind people have come to know and appreciate. To get this result, however, you must use light- or heavyweight braille paper.

Another nice feature is the Cranmer's relative portability; it is the only one of the three printers that can be moved from place to place easily.

The Perky also has a primitive editor that the other printers

don't have. Although the commands for the Cranmer's editor are confusing, it does enable a user to edit something before printing it. Thus, if a user knows that a word has been misspelled in a document coming from the computer, rather than stopping the printer, going back to a word processor and correcting the problem, and then commencing the printing, he or she can fix it with the editor. The embosser can be turned off while in editing mode.

Both the Cranmer and the Personal Brailler have a way of clearing the buffer which gives the user control over how much of a document is printed. This is especially useful if you want to print the same page over again. Both printers must be taken off-line to do this. On the Perky, the embosser can be turned on and off during the printing process. If you want to print page 7 three times, you can do this by clearing the buffer at the end of the page and printing that page again. If you need to skip over pages 8 through 13 and print page 14, you can do this by turning off the embosser for the duration of the transmission of those pages and then turning it on again at the appropriate page. The process is somewhat awkward, since you have to count tones that signify that a buffer has been transmitted. It takes about three tones per page. But it is far better than having to print all those unwanted pages or having to use the word processor to split a file so that a new file with the desired pages can be printed.

Finally, the Perky is the lowest-priced unit of the three, costing $2,350. It clearly represents a good value for the user with modest braille production needs.

Disadvantages

As the first personal brailler on the market, the Perky does not have some of the features incorporated in the other later models. Its weakest point is that sheets must be hand-fed one at a time. This means that the user must constantly monitor the machine to feed the paper.

A second major disadvantage is the machine's noise level. You feel like you're in a machine shop when this printer is running.

A third drawback of the Perky is the position of the switches. The switches—used to set the proper parameters for correct interfacing with a computer or other device—are not easily accessible. You must remove eight screws, take off the base of the machine, and then adjust the switches inside. If you are using the Perky configured to just one machine, you only need to do this once. If the machine is being used by several different people, connected to more than one device, this limitation will test your patience. In defense of the machine, however, all settings can be changed from the keyboard once the machine has been turned on. But there is no way to know what computer parameters the machine is set for when it is turned on unless, as mentioned previously, it is configured to just one machine.

Finally, the manual that comes with the Perky is incomprehensible. It assumes the user knows a great deal and is impossible for the novice to understand. There are two other sources. Raised Dot Computing has produced a very good manual for getting the Cranmer up and running with an Apple and Braille-Edit. And Kentucky Services for the Blind has a good reference guide which is not really a manual but which provides a great deal of information if you know what you're looking for.

Final Comments

There has been some controversary over whether this machine can use standard notebook-size paper. The manufacturer says "yes" in its literature, but one of the authors has been informed that the way the machine parts are designed and aligned does not guarantee satisfactory braille output on this size paper. What happens with some machines is that the paper will start to "skew"—resulting in overcrowding or irregular spacing between lines. One author states that by setting the right margin one or two characters less than you normally would solves this problem. Neither person had a problem with the larger-sized 11 x 11½ inch braille paper.

Finally, the Cranmer comes with a standard serial interface; if your computer requires a Centronics or parallel interface, you will need an additional peripheral to match your computer's connection requirements. Cranmers appear to be very popular as part of the Apple systems which use serial interfaces, and because Raised Dot Computing software has been designed to interface well with this machine.

TRIFORMATION'S PERSONAL BRAILLER

The Personal Brailler is available in two models: as a stand-alone braille printer or, like the Cranmer, with a keyboard. It is the largest of the three printers and requires its own table. All controls are labeled in braille and are located on the front panel of the machine.

This braille printer uses continuous, tractor-feed paper which is loaded through an opening at the bottom front of the machine. Like

most tractor-feed, inkprint models, the embossed paper collects in a fan-fold behind the machine.

The DIP switches for setting parameters are located at the rear of the machine and are easily accessible by a visually impaired person. The only drawback is the closeness of the switches to each other, as is the case with most peripheral devices.

Advantages

In terms of user friendliness, the Personal Brailler gets high marks. Access to the DIP switches, braille labeling of the control panel, and readability and organization of the documentation all demonstrate close attention to detail and excellent planning.

Second, the Personal Brailler is, by far, the quietest of the three. It was actually possible to work in the same room while the machine was producing braille.

Third, the machine has a large buffer (12,000 characters) for storing material transferred from the computer. This means that a user can start printing a short document and use the computer for other things at the same time, since the contents of the documents are stored in the printer's buffer.

Finally, as mentioned previously, the buffer can be cleared by taking the machine off-line, which gives the user control over how much of the document is printed.

Disadvantages

It is unfortunate that the "user friendliness" engineered into this machine does not appear to be matched by the machine's mechanical reliability. One of the authors had to work with two different machines;

the first one provided by the manufacturer for review proved erratic and was subject to intermittent mechanical failure. Certain essential parts of the printer—such as the tractor which holds the paper—appear to be of inferior quality to those used on the MBOSS. They frequently went out of adjustment, making it difficult to load and position the paper for the printing of long documents.

If you are interested in buying this machine, be sure you get a machine in good working order and that, if the machine fails mechanically, it will be promptly replaced with a satisfactory unit.

What is most unfortunate about this is that most of the mechanical problems appear to be relatively minor. They seem to be caused by flaws in the manufacture of certain internal parts of the printer. If the quality control standards were improved on this machine, it would be an outstanding piece of hardware.

A second weakness, experienced by one of the reviewers, is the quality of the braille produced. The machine has two settings: one which produces "draft" quality braille and the other which produces "letter" quality braille. The machine operates faster in "draft" mode. But in either mode, and on both machines tested by one reviewer, there was an inconsistency in the height of the braille dots produced along a line and throughout a page. This "fair" quality braille was noticeable with both heavy- and lightweight braille paper, and even when lighter weight "regular" paper was used. The other reviewer did not experience this problem. Again, it could be a quality control issue, and a buyer should check to make sure the unit works properly or is replaced.

Finally, a problem with both the Personal Brailler and the MBOSS-1 was the lack of flexibility for adjusting the left margin. The Personal Brailler only works with tractor-feed paper. The tractor feed for the left side of the machine cannot be adjusted because of the opening slot through which the paper exits at the top. Thus, printing always starts at the same distance from the left—a distance which leaves a large blank space between the left edge of the paper and where the braille printing begins. This makes it less practical to use notebook-size paper because of the reduced space for printing.

Final Comments

The Personal Brailler offers a great deal of flexibility. It has a built-in Grade 1 translator. The DIP switches allow the printer itself to format pages—a convenient feature if the software being used does not have this ability. For example, the printer can generate, without the need for software commands, consecutive braille page numbering at the upper right-hand corner of the page.

Additionally, the availability of a keyboard model and a built-in "scrolling" feature (moving the paper back and forth while printing without losing your place) allows this printer to work effectively as a printer computer terminal. This means that you could produce Grade I braille or computer braille directly from a computer system.

This printer costs $2,950 for the stand-alone model and $3,450 with the keyboard. If the mechanical bugs can be overcome, the Personal Brailler could provide a great deal of flexibility, attractive features, and user friendliness.

THE MBOSS-1 FROM VTEK

When you take the MBOSS-1 out of the box, you get the feeling you are looking at a workhorse—not very flashy but with staying power. This might be a good evaluation of the MBOSS-1. Despite the fact that this machine is a redesign of an inkprint printer and that, as a result, it has a number of peculiarities which range from "user neutral" to "user hostile," it does meet the need for light to moderate braille production.

The machine is slightly larger than an electric typewriter or standard letter-quality printer. It requires a special table for operating, because the paper is loaded through a slot underneath the middle of the table. The printer has four controls (not marked in braille) plus a number of indicator lights on the front panel of the machine. To insert paper or to adjust the paper by using the tractor-feed mechanism, the top of the machine must be lifted off.

The user receives information regarding the operating status of the printer, like "on-line" or "off-line," through a series of beeps. Two beeps, for example, indicates an "error" condition such as when the printer is out of paper, which must be corrected before the unit will print.

The MBOSS-1 comes with braille documentation, but the manual I received was not well-organized, and lacked vital, detailed information about the easiest way to insert a new sheet of paper.

In general, this printer seems to suffer slightly from a lack of "user engineering" best suited to the needs of a blind operator. This is understandable, to some degree, because VTEK traditionally has

designed products for the partially-sighted rather than blind user.

Advantages

To its credit, the MBOSS-1 can accommodate a variety of weights and sizes of braille paper. In testing this printer, one of the authors of this article was able to run over 1,000 pages of regular computer paper and produce an acceptable quality of braille. The tractors are adjustable (again, as with the Personal Brailler) only on one side to utilize different sizes of paper.

Paper handling is very easy for a machine using sprocket-fed paper. If you run out of paper in the middle of a document, it is easy to load a new package of paper and commence printing where you left off.

The MBOSS-1 is available with either serial or parallel interface. Although quieter than the Cranmer, it is a bit noisier than the Personal Brailler.

Perhaps the most significant feature of the MBOSS-1 is its reliability. On several occasions, this printer produced several 200-page documents unattended. This was not equally successful with the other printers—in fact, the Cranmer cannot be left unattended at all. The fan-fold paper stacked perfectly behind the machine. There was no evidence of "form creep", or printing over the paper perforations, as with the Personal Brailler.

Disadvantages

The major disadvantage of this printer is its lack of user friendliness. The DIP switches must be set by a sighted person and are inaccessible by touch: they are both inside the front cover and underneath the main body of the printer assembly. (According to the manufacturer,

this will be changed.)

Second, the MBOSS-1 produces braille on the reverse side of the page, rather than on the front of the paper as it emerges from the printer. Checking your work while it is printing is very difficult, although you can take the machine off-line and then restart it.

Unlike the Perky and Personal Brailler, there is no button on the MBOSS-1 to clear the buffer. The only way to clear the buffer is to turn off the machine and then turn it on again. Failure to clear the buffer by turning the machine off and on again, will result in the contents of the buffer being printed, no matter what. If you simply take the machine off-line and on-line again, it will resume printing from where it left off--even if you have completely removed that document from the computer, or even if you have turned off or disconnected the computer from the printer. That buffer will finish printing its contents, come what may.

The machine lacks such useful features as a paper reverse key and a true self-test mode. (The Personal Brailler has both; the Perky does not have a self-test.) While you can "test" the printer to determine whether all braille cells are working, you cannot determine the switch settings such as baud rate, parity, and duplex as you can in the Personal Brailler's self-test mode.

Final Comments

The MBOSS-1 costs $3,225. For this price, it should have more features and better "human factor" engineering. Nonetheless, it proved to be a very reliable braille printer producing good quality braille in quantities sufficient to satisfy most individual needs.

COMMENTS & CONCLUSIONS

Several new high-speed models of braille printers are being promised by manufacturers in the next year. A few are already on the market, such as the Braillo from Norway or the Resus from Holland--both are several thousand dollars more than the three braille printers just reviewed.

These "second generation" units will have more features and produce braille at a higher speed. As with all new products, these, too, will have their own unusual quirks and bugs.

The dilemma is whether to buy now or wait for something better. Despite their problems, these three units can produce acceptable braille at a speed that is satisfactory for the limited capacity needs of an individual. But they are not trouble-free.

PRODUCT INFORMATION

PRODUCT: Cranmer Modified Perkins Brailler (Perky)

SOURCE: Maryland Computer Services, Inc.
2010 Rock Spring Road
Forest Hill, MD 21050
(301) 879-3366

PRICE: $2350

SPEED: 10-12 characters per second

PAPER: Single sheet, manually fed

PRODUCT: Personal Brailler

SOURCE: Triformation Systems, Inc.
3102 S.E. Jay Street
Stuart, FL 33497
(305) 283-4817

PRICE: $2950 stand-alone model
$3450 includes keyboard

SPEED: 10-13 characters per second

PAPER: Continuous-feed paper

PRODUCT: MBOSS-1

SOURCE: VTEK
1625 Olympic Blvd.
Santa Monica, CA 90404
(800) 345-2256

PRICE: $3225

SPEED: 10 characters per second

PAPER: Fan-fold, tractor-fed paper only

Dipner Dots
Draft Quality Braille Printing

by Dean Martineau

PRODUCT: Dipner Dots

SOURCE: Raised Dot Computing
418 S. Baldwin St.
Madison, WI 53703
(608) 257-9595

PRICE: Variable depending on cost of printer and software

REQUIRES: Daisy-wheel printer

WHAT IS DIPNER DOTS?

Dipner Dots is a method of producing draft quality braille or inkprint braille dots from a standard daisy-wheel printer. The method gots its name from its inventor, Mr. Randy Dipner of Colorado Springs, Colorado. Mr. Dipner came up with the idea, but didn't pursue it, and was surprised therefore when he recently discovered that the method which now bears his name is gaining some popularity nationwide.

I have been an enthusiastic user of this method of braille printing for over a year. Quite frankly, the braille produced is of low quality and the printing procedure is slow, but the price is right: $10. For just $10 I was able to convert my daisy-wheel printer into one that could produce both braille and print with a few quick modifications. The braille is quite usable and at that price, who can complain?

IT'S IN THE SOFTWARE

The key to transforming an inkprint printer into a braille one is software. Currently, only one company supports or even disseminates information about Dipner Dots braille: Raised Dot Computing of Madison, Wisconsin. Their word processing programs, Braille-Edit and its new, souped-up counterpart, BEX, work with all computers of the Apple II series, and include programs for translating to and from American and British Grade II braille. They are not copy-protected and the user can make modifications to the programs or to the translation tables.

A user with special needs can request a customized translation program from the company. Purchasers receive a free, one-year subscription to Raised Dot Computing Newsletter and have access to technical support via the Technical Hotline or by mail. In the eighteen months that I have dealt with this firm, the technical support has become consistently more friendly and effective, and the documentation both simpler and more user-oriented.

Producing Dipner Dots braille with these programs is a fairly straightforward matter. Braille-Edit costs $300 ($275 if paid with cash), and BEX costs $100 more. This firm's support of Dipner Dots braille might encourage some consumers to choose their powerful and versatile word processors when deciding which of the various Apple-compatible word processors to buy.

Two factors make it difficult to give a thorough and objective evaluation of this method of producing braille. First, the quality of the braille produced, the clarity of the documentation, and the technical

support of the printer vary depending on the printer. Up to now, no tests have been done to determine which printer works best with Dipner Dots. Secondly, no manufacturer actively supports it; Raised Dot Computing advocates its use whenever possible, publishes articles about applications in their newsletter, and answers technical questions about it on the Technical Hotline. But Dipner Dots is a by-product of Braille-Edit, which means that methods for improving the process are being done by users with varying amounts of technical know-how and little money with which to experiment. Dipner Dots is a rarity in the sensory aids arena—a fortuitous accident which many users are trying independently to exploit to the fullest.

HOW DOES IT WORK?

To produce Dipner Dots, you must have a daisy-wheel printer; dot matrix printers can make inkprint braille dots (discussed later in this article), but cannot emboss braille. The printer must have these characteristics:

1. You must be able to turn off all auto line feeds and adjust the vertical spacing to eight lines per inch. These changes can be made by either setting the DIP switches on the printer itself, or by typing commands to the printer from the computer keyboard. Given the small size and often inconvenient location of DIP switches, I find the latter method preferable. The printer manual should indicate the appropriate key-strokes needed to make these changes;

2. Optimally, it should be possible to change the intensity of the hammer stroke, so that it can be made to strike the paper with maximum force;

3. It is desirable for the daisy-wheels to have metal sleeves, or at least for the period to be made of metal.

Many users use the period to emboss braille, so the period should be of lasting quality;

4. Either serial or parallel printers can be used. The initial set-up procedure is somewhat easier with serial printers, but an article in the December 1984 issue of Raised Dot Computing gives precise instructions for printing Dipner Dots with a parallel printer;

5. The printer must be able to receive the Control-U half-line feed character from the computer.

Once you have chosen your printer, and have acquired your Apple computer and your copy of Braille-Edit or BEX, you are well on your way. The documentation with these programs explains how to set up an input-output configuration, which tells the computer that you are using the Dipner Dots method. You must then create a braille file; the programs offer many ways to do this. You can prepare your document in print using the Apple keyboard or an external device and have the file translated into Grade I or Grade II braille using one of the translation programs provided on the disk. Or, you can generate it in braille by using an external device (VersaBraille, Cranmer Modified Perkins Brailler, etc.) or the braille writer keyboard option from within the program, in which the z, x, c, n, m, and comma keys are transformed into the six keys of the standard Perkins brailler. Once you have this braille file, you give the appropriate printing command to the computer. It then divides each line of braille into its three component lines, printing dots 1 and 4, then dropping to print dots 2 and 5, and finishing with dots 3 and 6.

HOW WELL DOES IT WORK?

The few users I know report they are happy with their application of the process, treating it more like a lucky accident which offers them a low-cost braille printing alternative.

I use the Dipner Dot with the Qume Letterpro-20, which can be purchased for under $600. It prints at a rate of 20 cps and brailles at a speed of around 3 cps. (There is approximately a nine to one ratio between the speed at which a printer handles print versus braille printing.)

To facilitate the embossing, I use a double thickness of rubber backing, such as the kind used in babies cribs (the only additional expense). Since the Qume does not come equipped with a tractor feed, I feed this rubber sheet along with each new piece of paper I insert into the printer. This is an awkward process, but with practice it becomes routine.

Since I am a good braille reader, and because I want to get the most on every page, I have found that by setting the character pitch of the printer at 15 characters per inch, I can get 37 cells to the line and 31 lines to the page using 8½ x 11-inch bond paper. By using a pitch of 12, I get 32 characters to the line and 31 lines per page and the braille is much clearer. The braille produced in both configurations is quite usable by me and the few others who have used it, but it is not equivalent to the well-embossed braille produced on the same kind of paper using a slate and stylus, for example. A good and experienced braille reader would be able to read it effectively.

I use Dipner Dots to print my material when the office Cranmer Perky is being repaired, and to print copies of reports and other documents (such as this one) for proofreading and rewriting. The fact that the material is translated into Grade II braille helps to compensate for the lightness of some of the dots, as a bona fide typo will usually show up clearly when the word is translated into Grade II.

The steps involved in turning the Qume from an inkprint printer to a braille one are few. I remove the ribbon cartridge, now unnecessary, and wrap a write protect notch cover from a box of disks around the sensor. This fools the sensor into thinking the ribbon is in place. I set the hammer strike to hard. Finally, I send a few characters to the printer which turn off the unwanted line feeds, allowing the printer to make the small movements needed for braille printing.

Although I am satisfied with the braille produced by my Qume printer, it is not perfect. First, the manual embodies all the gobbledygook and user unfriendliness computer purchasers have come to dread. In short, it's ghastly! Secondly, it appears that all functions cannot be controlled from the computer keyboard. For instance, in order to change the character pitch, you must tamper with a bank of particularly inaccessible DIP switches.

Another user embosses with the Dipner Dot method using a Brother HR-15 printer, which is less expensive than the Qume. He, too, uses a double thickness of rubber sheeting and has been able to install the sheet in such a way that he doesn't need to feed it with each piece of paper. He is able, therefore, to use the tractor feed which facilitates the printing process. He uses both bond and thermoform paper—

the dots being less pronounced but more durable with the thermoform. A less proficient braille reader, he uses a character pitch of 12 and obtains 28 characters per line with 26 lines per page. We both use the period as our embossing character, although he knows of people who have filled in the "@" sign and used it—producing a larger dot.

Articles in the July and December 1984 issues of Raised Dot Computing Newsletter have fully described his procedure. He has encountered one problem that I have not experienced: he reports that after printing a fifteen-page document, the dots near the end became less pronounced and the printer hammer was very hot. He speculates that he may have slightly overtaxed his printer. Perhaps the reason I have not encountered his problem is that I am not using continuous-feed paper. It takes my Qume about five minutes to crank out a page, so I often try to accomplish something else during that time. Generally, that means that I don't get back immediately to change pages, and the printing mechanism gets a good rest between sheets. Both he and I have found the procedure to be fairly quiet. The Qume is much quieter making Dipner Dots than it is as a regular printer, probably due to the backing sheet.

Still another user employs the Brother HR-25. She chose this printer because its roller can be easily removed. She has a spare roller wrapped with low-resilience rubber. To convert the printer from print to braille, she simply changes rollers. I hope to conduct comparison tests to determine whether this more expensive and elegant procedure produces a better quality of braille.

A final question nags at me from time to time: Am I damaging my printer? The answer appears to be "no." I explained my activities to

the Technical Support people at Qume and didn't elicit any horrified response. One Brother HR-15 user asked the Brother factory directly; their opinion was that any reduction in the overall life of the printer, because of its dual purpose as a Dipner Dot printer, would be minimal.

PRODUCING INKPRINT DOTS WITH DIPNER DOTS

A useful application of the Dipner Dots process is its ability to produce inkprint braille dots. Again, the Braille-Edit User's Guide explains how to set up an input-output configuration in order to do this. There is also another piece of Apple software, Bob Stepp's EDIT program for braille transcribers, that offers this option. Using the Dipner Dots process to produce inkprint dots could have four possible uses:

1. Some computer-assisted braille transcribers use inkprint dots in order to proofread their work;
2. Visually useful samples of what braille looks like can be produced;
3. Braille-reading Optacon users may prefer reading inkprint dots with the Optacon;
4. I have found it useful to produce a draft for a plaque which a local engraver could then photograph and engrave braille directly on the plaque.

COMMENTS & CONCLUSION

In the near future, I hope to remove some of the uncertainty of the Dipner Dots process by talking with other users, exchanging samples of braille and ideas for improving the process. These recommendations and findings will appear in the Raised Dot Computing Newsletter and in Sensory Aids Foundation's Technology Update. Anyone wishing to learn

from or add to this pool of information is welcome to call or write me (see listing at the back of the book).

Dipner Dots won't be useful for everyone. But for the good braille reader whose motivation is high and financial resources low, it offers an inexpensive and useful method for producing braille.

BRAILLE TRANSLATORS FOR PERSONAL COMPUTERS

by Olga Espinola

There are two sophisticated braille translators on the market today: the Duxbury Systems Translator, $495, written for the IBM PC, and Braille-Edit, $300, for the Apple family. Both translators are powerful and work well, but they operate differently and serve, therefore, very different needs. The following article will look at some of these differences and how they can best be utilized. A third option will probably be available soon; Raised Dot Computing is working on a translator for the IBM PC as well.

The purpose of a braille translator is to translate text on a computer disk from print to braille and, in most cases, back from braille to print. The translator can also format text and send it to an external device such as a braille printer, inkprint printer, or paperless braille device. There are basically two ways in which this works: one is to operate directly from a dedicated word processor, like Braille-Edit, and the other is to work with ASCII textfiles, most typical of the Duxbury System. There are advantages to both methods, as we will see.

BRAILLE-EDIT

The Braille-Edit software written for the Apple family of computers is an extensive series of programs which encompass many aspects of word processing. Here we will focus only on its ability to translate to and from braille.

Braille-Edit is a dedicated word processor for the blind and offers the user the advantage of reviewing and editing text with the same software used for the braille translation. A user can even produce an inkprint copy of a document for a sighted colleague with the Braille-Edit software. But, if a user needs to interact with others who do not have the same software, ASCII textfiles must be created from the Braille-Edit chapters.

Running the Grade II translator and back translator of Braille-Edit is very easy. They are accessed from the main menu of the program and provide simple prompts to the user. More than one chapter can be translated at a time. To print a chapter to a braille or inkprint printer, a separate utility from the main menu must be used. The user has full control over what portions of the document get translated. By enclosing a passage between special symbols, the user can indicate that that passage is to remain in computer braille. The user can place formatting control sequences within the text to produce properly formatted pages. These are very logically arranged and are generally easy to remember.

The Grade II translator is very effective and almost perfect in its handling of unusual passages. It can even handle some Nemeth symbols very well, like plus and equal. The back translator has some problems with special passages; however, Braille-Edit provides a method for fixing these problem areas with its Transformation Chapter Utility. In effect, this gives the user a way of producing his own translation tables. This feature must be handled with extreme caution, though, since results can be disastrous if mistakes are made in the transformation chapter.

Overall, Braille-Edit is an excellent tool for producing personal documents, particularly if you are doing a lot of editing. It allows the user great flexibility over the translation process. The person editing the document need not know braille in order to work with it.

THE DUXBURY SYSTEMS TRANSLATOR

The Duxbury Translator was originally intended for mainframes in braille printing houses. Eventually a minicomputer version was written and now a new version for the IBM PC has just arrived on the market. This system of programs performs translation to and from braille on any ASCII textfile. It is not a word processor and has no editing capabilities. Rather, it assumes that the user has created the textfile from a commercially available word processor, like WordStar. It is very easy to run, and the user does not need to know braille in order to use the Duxbury Translator.

The Duxbury Translator is the fastest translator known and is the only one that can handle foreign language passages. Special symbols can be embedded in the source textfile to indicate a foreign language passage that the Translator should handle differently from normal translation. The user can even input symbols that will create appropriate braille accent symbols for various languages. Currently, there are symbols for Spanish, Latin, Italian, French, and German. These symbols make the reading of the source textfile somewhat awkward, but do create properly translated braille.

The Translator has difficulty with simple Nemeth symbols that may appear in the text, like plus or equal. It will translate these into

words rather than retain the symbol. It is possible to switch from Grade II to Grade I braille and back within a textfile, but computer braille is much more difficult to achieve. The translator will handle italics in braille quite well.

Formatting is handled by a separate subprogram of the Duxbury Translator. The user has control of braille and print page numbering and location of page numbers, running titles, length of pages and characters per line, etc. At this writing, there is only a print-to-braille formatter. This means that a user cannot produce an original braille document from a paperless braille device and have it properly formatted when translated into print. (A braille-to-print formatter will be added shortly.)

The Duxbury Translator is very useful for the person working in a business setting who has to contend with documents written by co-workers on another word processor. It provides flexibility in that the person creating the document can use whatever word processor he or she prefers. However, it is somewhat restricting since the user cannot easily write exception tables for the Translator.

FINAL COMMENTS

Both the Braille-Edit Translator and the Duxbury Translator are powerful and effective translators depending on the user's application. Both translators will output to any number of braille and print devices as well as paperless braille devices. Both have good documentation.

Raised Dot Computing has done a superlative job with their specialized software for the blind and have a proven track record regarding technical support. In fact, they have set the standard for

technical support in the field—something a potential user should not overlook given the complexity of this technology.

On the other hand, the IBM PC is now a mainstay in the business community. If a blind person is to function within such a work environment, adaptive software may create unnecessary hassles. It seems more reasonable to expect the blind individual to adapt to the software already in use at the office. The Duxbury Translator provides a means of doing this quite easily.

In short, it is really a question of application when determining which translator to buy.

BILL GRIMM TALKS ABOUT BRAILLE-TALK

by Diane Croft

Bill Grimm, who was blinded in a motorcycle accident in 1973 shortly after receiving his degree in computer programming, is president of Computer Aids Corp., a five-year-old software company specializing in applications for the blind.

I met Bill at a national convention last July, where he was demonstrating his latest wares, including the Small-Talk portable talking computer which is also reviewed in this book. Over breakfast, I asked him about his braille translation program, why he had decided to develop translation programs for the Apple and IBM when other translators were already on the market, and who was buying his version. The following comments were gleaned from this breakfast interview and subsequent conversations.

* * * * *

Q: Bill, I know you have developed a braille translation program but, quite frankly, I don't hear much about it. Are you selling it, and does your program work with both the IBM and Apple computers?

A: Yes, Diane, we are selling a braille translator called "Braille-Talk." The Apple version sells for $125 and will run on an Apple IIe or IIc. The IBM version sells for $195 and will run on any IBM PC or PC-compatible with a memory of 128K or better.

Q: Why did you decide to market a braille translator? You know, of course, that Braille-Edit is very popular with Apple users, and the Duxbury Translator now handles the IBM line.

A: That's a good question because people don't understand that our product was never meant to compete with Braille-Edit or Duxbury. Braille-Talk was designed to offer a simple, low-cost alternative to the other translators. We felt there was room for a program which was not as sophisticated as Braille-Edit or the Duxbury program, but which still offered braille translation. In the general marketplace, there are hundreds of printers and modems for people to choose from—each with a different price tag offering different features. Braille-Talk is another option for people to choose from.

Braille-Talk is a simple, straightforward, inexpensive braille translator intended for individuals, for use in secondary school systems, or in rehab settings where people are producing braille for individuals. Braille-Talk was not intended for agencies that produce textbooks, or other materials that require extensive and very exact formatting. Braille-Talk translates text into Grade II braille—no more, no less.

Q: What makes it different from the other translators, and how does it work?

A: As I mentioned before, Braille-Talk is a simple program. It does not have an editor like Braille-Edit or Duxbury. It does not contain a word processing program like Braille-Edit, nor does it handle foreign languages like the Duxbury program.

What Braille-Talk does offer, besides simplicity, is flexibility. Braille-Talk allows you to use your own word processing program. It might be a special talking word processor like our Word-Talk, or a standard program like WordStar. The point is that you can use the word processor of your choice. What we supply you with is a braille translator.

Braille-Talk takes a file, created by a word processor, and translates it into a new file which can be run through a braille printer such as the MBOSS-1, Perky, LED 120, or paperless braille device. It is entirely menu-driven, so that it's easy for anyone to use. It was our intention, in creating the program, to keep it simple and not complicate the program by making it multi-purpose. Also, we wanted to enable the user to choose their own word-processing program. Braille-Talk is straightforward and to the point--it goes in and gets the job done inexpensively and without much sophistication or learning on the part of the user.

Q: *Who is buying your program?*

A: The primary market for our product has been secondary school systems, where they have a braille embosser and their basic objective is to provide class handouts for one or two blind students. As I mentioned, the teacher can use whatever word processor he or she prefers. We also have a lot of end-users, blind individuals who want to produce something for themselves, or something for someone else. For example, a fellow

uses his program to produce braille copies of a newsletter for a state-wide organization of blind people. This was the market for which the program was intended.

Q: How fast is your translator?

A: In a recent test, the IBM PC version translated 11 double-spaced pages in a little under 3 minutes. I'm not sure how that compares to others, but I think that's pretty quick. I could live with that kind of performance. Of course, the speed varies depending on the specific computer and processor being used. The Apple version isn't as quick, but I don't have any performance data.

Q: What kind of control does the user have over formatting?

A: Braille-Talk offers the most commonly used format controls. You can, for example, define the width of the braille line, the length of the braille page, indentations for paragraphs, or virtually anything else you like. The program will provide for running headers, page numbers, and — through embedded commands — you can control the level of translation. You can have no translation, simple Grade I, or Grade II. Also, through embedded commands, you can have braille tables done in columns by going in with embedded command characters and indicating where the columns should be aligned and so forth. You can have a multi-column print; in fact, there is a five-column chart that's provided on the Braille-Talk disk as a sample file.

Q: Can the user adjust the translation tables and insert their own rules?

A: Yes, we are very pleased with our approach to this. The translation tables are wide open to the user, and the documentation gives examples on how to insert your own rules. In fact, you can insert up to 100 of your own rules. Let's say, for example, that a word doesn't translate right. You can put that word in and tell the program exactly how you would like it translated; your rule will override our translation table. The program looks at the user-supplied table first, and then, if nothing is found, it reverts to the built-in table.

Q: One last question. Is your documentation available in braille or on cassette?

A: As is true with all of our products, documentation is available in print and on cassette. We also have a toll-free number which should be used for product information or to place orders. Our other number is for general business purposes and for customer service.

Bill, thank you for taking the time to explain Braille-Talk.

BRAILLE TRANSLATION SOFTWARE

PRODUCT: BRAILLE-EDIT, BETTE

SOURCE: Raised Dot Computing
408 South Baldwin Street
Madison, WI 55703
(608) 257-9595

PRICE: $300, $400

COMPATIBLE: Apple II series

PRODUCT: Duxbury Translation Software

SOURCE: Duxbury Systems, Inc.
435 King Street, PO Box 1504
Littleton, MA 01640
(617) 486-9766

PRICE: $495

COMPATIBLE: IBM PC

PRODUCT: Braille-Talk

SOURCE: Computer Aids Corp.
124 West Washington, Lower Arcade
Fort Wayne, IN 46802
(219) 422-2424 or (800) 647-8255

PRICE: $125 for Apple-compatible
$195 for IBM-compatible

COMPATIBLE: IBM PC or Apple II

CHAPTER 4

A Buyer's Guide to Inkprint Printers

INKPRINT PRINTERS: GETTING IT DOWN ON PAPER

by Barry Scheur

When it comes to buying an inkprint printer, blind people face some — but not all — of the dilemmas that sighted people do. First, there is a bewildering array of printers on the market, literally hundreds of brands in all price ranges. Manufacturers are cramming more and more features into their models, creating enough competition to force the prices to drop.

This is good news for the user, if you can distinguish just which features you need. This article will offer a general overview of inkprint printers with an emphasis on word processing, since this is the most common use for printers. This chapter will, hopefully, guide you through the maze of printers to help you decide which features should be given priority for your particular needs.

IMPACT AND NON-IMPACT PRINTERS

Printers are generally divided into two major categories: impact and non-impact. Impact printers are more popular and are of two types: daisy-wheel and dot-matrix. Daisy-wheel printers offer the highest quality printing while dot-matrix printers are generally less expensive and offer a wide array of features, including speed. It's getting more and more difficult, however, to distinguish between the two. The prices of letter-quality printers have dropped dramatically. At the same time, the higher-priced dot-matrix printers, using a variety of

printing methods including emphasized print, double-strike, and dots produced so close together that they resemble typewritter-quality letters, make it difficult to pick a model to meet your needs.

Further complicating the picture is the recent introduction of non-impact printers: thermal, thermal transfer, inkjet, and laser. While these printers meet a variety of highly specialized requirements such as quietness, high speed, exceptional quality, and beautiful graphics, they may not meet your unique needs.

What makes this process even more bewildering for the visually impaired user is the problem of evaluating a printer's quality of reproduction if you have no concept of differences in appearance, or making sure that your special software will take maximum advantage of the machine's features.

JUDGING QUALITY

Dot-matrix and daisy-wheel printers produce letters in basically the same way. A carbon or fabric ribbon is struck to produce an image on the paper. Daisy-wheels are so-called because the element producing the print looks like a daisy with a letter, number, or punctuation character at the end of each petal. The wheel rotates to select the right letter, and the petal is then pressed against the paper to produce the letter.

The print head of a dot-matrix printer is made up of rows of tiny wires. The wires are "fired" electronically onto the paper, producing corresponding dots. Obviously, the denser the pattern of wires, the denser the dots and the better the quality of the print.

While computer salespeople will try to convince you otherwise, true "letter-quality" — like you would get from a conventional typewriter — can only be found on a daisy-wheel machine.

Manufacturers of dot-matrix printers have come up with several ways to improve the quality of their print. One method involves either moving the print head in smaller horizontal increments than usual, called "emphasized print," or having the print head make two passes across a line at slightly different positions to produce denser dots, called "double-strike," or a combination of both methods, called "near-letter-quality."

The alternative method involves relatively new technology which changes the characteristic 9-by-9 wire print head to a 24-wire head, using much thinner wires. This eliminates the need for both the print head shifting position and for multiple passes.

What's right for you will depend on your printing needs. Draft-quality text is more difficult to read, but it's often acceptable for occasional letters. Near-letter-quality print is becoming more acceptable, although certainly not the standard, for limited volume printing needs. It's fine for personal correspondence and for some informal business correspondence and school work. But if you need to produce a high-quality report which others will critically judge, there is no substitute for letter-quality. Remember, you may not be able to see what you print, but others may judge it as much on its appearance as on its content. If you can afford it and don't have to sacrifice other features you need, you should opt for a letter-quality printer.

SPEED DOESN'T KILL, BUT BOREDOM MAY

A second major consideration in choosing a printer is speed. Dot-matrix printers produce text at speeds of from 80 to 200 characters per second (cps). These speeds are generally for draft quality; near-letter-quality speeds will be roughly ¼ to ½ of the printer's draft speed.

Most daisy-wheel printers, priced under $1000, are rated between 12 and 36 cps. You may think 20 cps is fast, since it works out to 240 words a minute. That's faster than anyone could type. But if you are producing a 30-page term paper and must continually reload the paper with single sheets, you could die of boredom. A 30-page paper being printed at 20 cps will take between 40 and 50 minutes to complete.

Factors other than pure speed affect the actual speed of the machine. Some printers print bidirectionally — that is, they don't have to go back to the beginning of each line each time. Some have logic-seeking capabilities, which means they don't need to go to the end of a line if it is blank, but skip over the empty space.

To help you make a decision about printing speed, you should first figure out how much printing you will do in a day or a week. If it's between 50 to 100 pages a week, and you are concerned about quality, you should consider a daisy-wheel. If your needs are between 100 and 200 pages a week, and quality is less of an issue, then you could choose between a daisy-wheel or a dot-matrix printer. If you need portability or if you need to produce a large volume of material, then dot-matrix is the way to go.

Another factor that affects printing speed, indirectly, is the type of paper feed you use. Most dot-matrix printers either come with

or have available an inexpensive tractor-feed mechanism. A tractor feed allows you to put a box of computer paper next to your printer and print an entire document without ever changing the paper. Each sheet is perforated and the document can be separated into single sheets after printing is finished. This process saves time in terms of paper loading and frees you up to do something else while the machine is printing.

You can buy tractor-feed paper in many styles, including bond paper, which is often used for papers, reports and letters. Letter-quality printers typically offer a tractor feed only as an expensive option. For example, my Radix-10 dot-matrix printer has a $24 tractor feed option. My Diablo daisy-wheel printer's tractor feed costs around $400.

Finally, you might want to consider another kind of speed — the speed at which you will be able to access your computer. If you are printing a document, it will be sent from your computer. If it's a long document, you won't be able to use your computer for other tasks as long as the document is being sent to the printer. To solve this problem, some peripheral manufacturers have introduced print buffers— little boxes of memory which can transfer part or all of your document at high speeds out of your computer to the printer. This allows you to start using your computer again while the document may just be starting to print. Storing a full page of text will require about 3K of memory. Buffers are generally available in 16K blocks, ranging up to 256K or the equivalent of 85 pages. If you are going to print a lot of long documents, or need immediate access to your computer, you should seriously consider buying a buffer.

OTHER FEATURES

It would be impossible, well, close to impossible, to describe the full range of printer features available on the market today. Some of the following brief items are perhaps the most important ones:

Variable Pitch: Some printers can produce anywhere from 6 to 18 characters per inch (cpi) on a line, with 10 to 12 being the standard. The smaller the number per inch, the easier to read. On the other hand, if you're going to be working with spreadsheets, you may need to cram as much as possible on a line.

Vertical Pitch: This feature allows variation in the number of lines per inch. The standard for a typewriter is generally 6 lines per inch, with 8 being an option. Machines with low horizontal and vertical pitch capabilities may be able to produce print that resembles large type (but make sure your software can handle this).

Graphics: Dot-matrix printers have much more flexibility to produce color graphics than do daisy-wheel printers.

Interfacing: More than one person has purchased a printer with a parallel port which needed a "converter" to match the serial printer port on their computer. Match the printer interface to the needs of your computer, if at all possible.

Portability: You may want to look at one of the newer thermal, thermal transfer, or inkjet printers — some of which work on rechargeable batteries.

Tactile Buttons: Most printers tend to come with "touch-sensitive" front panels which don't have raised buttons. You can label these in

braille or with some other raised-line indicator, but it's nice to have the buttons.

Paper Out Sensor: Some printers sound an audible alarm when you are out of tractor-feed paper.

Ribbon Loading: Many printers use cartridges of various types, and some are very difficult to load without sight. Try changing the ribbon, if you can, before you buy the printer.

DIP Switches: These switches allow you to set the printer to correspond to the communications requirements of your computer. On many printers, the DIP switches are inaccessible to a finger, and must be set by using a paper clip. Switches which can be set by touch are a real advantage.

Paper Guide: If you plan to use your printer with a paperless braille device, you should get one that allows you to adjust the left margin. Both the VersaBraille and the MicroBrailler cannot send commands from their software which will adjust the width of the left margin. If you cannot adjust it manually through a paper guide, you may be disappointed when the printing begins at the left edge of the page.

Noise Level: Many dot-matrix printers sound like a semitruck clattering through your office, while others can be bought with an "acoustic" cover to deaden the noise. Make sure you can stand to be in the same room with your printer when it is running.

A FINAL WORD ABOUT SOFTWARE COMPATIBILITY

The flexibility of your printer will depend largely on your software. You may want, at some time or other, to underline certain words, produce special symbols, or perhaps produce different styles of

type on the same page. Each printer uses "codes" which are generally computer-generated sequences of several characters (often involving the "escape" key to produce the specific results). Some printer codes, such as those used on the Diablo, Epson, and Qume printers, are compatible with most software. Therefore, first check that your software for word processing is compatible with the codes which your printer will use to take advantage of all of its special features.

Second, realize that "specialized" software that works with speech or braille may not be compatible with printer codes on your machine. This may be less of a problem if you can utilize unmodified software. It's best to choose your printer at the same time or after you have decided on word processing software.

NEW AND IMPROVED PRINTERS

The fickle fate of computer products — here today, gone tomorrow — forces even the bravest of technical writers to consider climbing into the nearest wastebasket along with their now-obsolete manuscript. There's nothing quite like nursing an article from inception to maturity, just to have it die along with some company's bottom line.

But the beauty of the free-enterprise system, while forcing the weak to drop out, insures that those who stay to play must compete — and compete vigorously. And keeping up with the Joneses doesn't necessarily mean building a whole new house, but rather adding those little extra touches that keep the neighbors hopping, and talking.

That's why new printer models look very much like the models that preceded them. For example, the Brother HR-15 is now being sold as the Brother HR-15XL for the same price, but with a little extra speed. And the Brother HR-25 is the same as the HR-15XL except that it has a wider carriage and a little extra speed. And that's why this technical writer decided to climb out of the wastebasket and put the following reviews together.

The printer reviews included in this chapter aren't necessarily of the latest models. We prefer to have a product on the market six months before reviewing it; therefore, some reviews—while based on older models—contain a great deal of information regarding the new and improved model. The specific differences are noted at the end of each review.

Great Little Printer
Portable Dot-Matrix Printer

by Barry Scheur

PRODUCT: Great Little Printer (GLP)

SOURCE: Centronics Corporation
One Wall Street
Hudson, NH 03051
(603) 883-0111

PRICE: $300

The Great Little Printer (GLP) is a six-pound, portable dot-matrix printer aimed primarily at the portable or "lap" computer market. Reasonably priced at $300, the GLP contains many features found only on more expensive printers.

A number of blind people are using this printer for several good reasons. First, it comes packaged as part of a system with the MicroBrailler (a paperless braille device from Triformation Systems). Second, it is one of the least expensive models on the market that offers both "near-letter-quality" and "draft" printing modes. As well, the printer is incredibly easy to load and operate.

A unique characteristic of this printer is that it can be used to print material directly from a paperless braille device. While other printers can do this too, few "portables" work well with these devices.

The problem generally stems from the lack of software flexibility in the paperless braille device to set a left margin. Since the carriage of most small printers is only 8½ inches wide, printing starts as

far over as possible. Documents with no left margin are fine for draft-quality work, but not for distribution. The GLP, on the other hand, has enough carriage width to allow for a margin.

Even if you don't need a portable printer to work with a paperless braille device, the GLP is a good, though not spectacular, portable from the perspective of a blind operator. DIP switches must be set with sighted assistance. The "status" panel is touch-sensitive and without buttons. But ribbon changing is simple, and it is easy to align the paper by touch.

The manual is available in braille or on cassette from Howe Press. It contains some additional material written for a blind user in conjunction with Braille-n-Print (a device which is also reviewed in this book). But the control codes are conveniently located at the back of the manual and in a separate volume for easy reference.

The Hewlett-Packard ThinkJet Printer

by Mark Haas

[Reprinted with permission from the January 1985 issue of BYTE magazine. Copyright (c) by McGraw-Hill, Inc., New York 10020. All rights reserved.]

PRODUCT: ThinkJet Printer

SOURCE: Hewlett-Packard Company
1081 Embarcadero Rd.
Palo Alto, CA 94304
(800) 367-4772

PRICE: $495 (all models)

The ThinkJet printer is a lightweight ink-jet printer that comes in three "flavors": the HP 2225A, with an HPIB (Hewlett-Packard Interface Bus) IEEE-488 interface; the battery-powered HP 2225B, with an HPIL (Hewlett-Packard Interface Loop) interface; and the HP 2225C, with a Centronics-compatible interface for use with most non-Hewlett-Packard computers such as the IBM PC and Apple computers. The printers are identical in all other respects including the price of $495. Each printer is about 11 inches wide by 3½ inches high by 8 inches deep and weighs about 6½ pounds. The unit I tested, the HP 2225B, sat nicely on top of the 9114A disk drive I had already connected to the HP 100 portable computer. The ThinkJet features most of the things you'd expect in a printer, including several print pitches, bold and underlining, short line-seeking logic to position the print head, graphics, and reasonable speed. I was also impressed by the ease of setup and use.

SETTING IT UP

Before I could use the ThinkJet printer, I had to connect it to the HPIL, which is Hewlett-Packard's proprietary scheme for connecting computers and peripherals. Connecting any device to the HPIL is child's play because it's virtually impossible to connect the cables incorrectly. In some situations, however, you have to place a device in a certain position in the loop. This is the case when using the ThinkJet in a loop with both the HP 110 portable and the HP 150 desktop computers (using the Portable-Desktop Link): you must position the HP 150 before the ThinkJet printer and after the HP 9114A portable disk drive. The owner's guide that comes with the Portable-Desktop Link provides more details.

Regardless of which interface you have, the next step is to insert the print-head cartridge, which comes in a metal container not unlike those used for salad dressing on the airlines. You remove the thin foil top by peeling it back to reveal the cartridge and a small piece of blotting paper called an absorber. First, you insert the absorber in a small metal clip at the left end of the carriage. The absorber catches the initial spurt of ink the printer makes when first turned on. You then drop the cartridge into the print-head carriage and close the retaining latch by lifting upward. The manual says the latch will snap shut. Mine did not snap, though it was closed firmly. If anything, it seemed to snap when opening the latch.

The cartridge itself is quite amazing. Cylindrical in shape and just over an inch long, the clear plastic cartridge houses a plastic sack containing the ink supply and a solid-state device that squirts

the drops of ink. Actually, it's an array of squirters stacked 12 high. Electrical paths lead from each squirter down the front of the cartridge to small contact points. When the cartridge is installed, these contacts connect with matching contacts on the carriage assembly. Changing the cartridge, therefore, not only replenishes the ink supply but also replaces the entire print-head mechanism--for only $7.95. Each cartridge is good for about 500 pages of text and has an expiration date.

Choosing the proper paper is very important. Since the printer is actually projecting droplets of ink onto the paper, the ink will bleed on a paper that is too absorbent--roughly equivalent to writing with a fountain pen on tissue paper. So be sure to buy paper suited for an ink-jet printer. The paper supplied by Hewlett-Packard has only one good side, and therefore you must be careful how you load the paper.

I found the paper loading to be very easy. The left pin wheel (tractor) is fixed so only the right side needs to be adjusted. You insert the paper from the back, under the paper separator, place it behind the pin wheels, and bring it around to the front. There is no platen. After you adjust the right pin wheel and close the paper bail, you're done. The ThinkJet will accept both single sheets and fanfold paper.

Since the ThinkJet 2225B is battery powered, you don't have to plug it in before turning it on, which you do by hitting a rocker switch on the back of the printer. You can perform the built-in self-test by holding down the line-feed button and turning the printer on. When you release the button, a programmed set of printed examples will appear,

including the full character set, graphics, different pitches, etc. A full page is printed, though you can terminate the test at any time by turning the printer off.

I had never used an ink-jet printer before, and I was impressed at how quiet the ThinkJet was. All I heard was the gentle whir of the motor moving the print head back and forth. There's none of the high-frequency noise usually associated with print-head pins hitting paper.

PRINTER FEATURES

Though the ThinkJet printer doesn't perform as many functions as some of the more powerful (and expensive) printers, it can be quite flexible. Through software commands you can control pitch, print attributes, page length, text length, and graphics.

The ThinkJet can print in four pitches: normal (12 characters per inch--cpi), expanded (6 cpi), compressed (21.3 cpi), and a combination of expanded and compressed (10.7 cpi). Given the maximum line length the ThinkJet can print, each pitch has its maximum number of characters per line: normal, 80; expanded, 40; compressed, 142; expanded-compressed, 71. The ThinkJet cannot print normal characters at 10 cpi (as called for in BYTE's benchmark test) so the speed was performed at 12 cpi.

ThinkJet can print each of the four pitches in bold, underlined, or both, all in one pass of the print head. You can set the line spacing (either 6 or 8 lines per inch), the page length (up to 255 lines), and the number of lines of text on each page. The last two are related, however, and changing the page length alone automatically adjusts the text length to 1 inch less than the page length. A full line of text

still leaves a 1-inch margin on both the left and right sides of the paper, and there is no way to override this. The display functions mode is useful for debugging, and it prints control and escape sequences rather than executing them.

If you intend to use the ThinkJet printer with commercial software packages that have graphics output, such as Lotus 1-2-3, be aware that ThinkJet interprets graphics data that it receives from the computer differently from other popular printers such as Epson's. Unless you are up to writing your own graphics drivers, you should make sure that the software has a driver for the ThinkJet.

DOCUMENTATION

The ThinkJet printer is very easy to use, so not much is required for documentation. The manual includes sections on: initial setup, with appropriate warnings about things like not eating the ink; how to use each printer function and a table containing decimal equivalents of the command sequences that makes BASIC programming a snap; an explanation of the graphics function, including a simple example; a short maintenance and troubleshooting guide; and appendixes on using the printer with the HP 41, HP 71, HP 75, and HP series 80 computers. The manual also discusses how to connect the ThinkJet printer through an HPIL/HPIB (IEEE-488) interface converter.

BYTE BENCHMARKS

As I explained previously, I did the BYTE benchmarks for the ThinkJet printer in the 12-cpi (normal) mode. Note that the ThinkJet's print head moves at a constant linear velocity, even for bold and underlining. Since the linear velocity is fixed, the number of characters per second (cps) is really dependent on the pitch of the characters. The ThinkJet prints a line of 40 characters in expanded mode, for example, in the same time as it prints a line of 142 characters in compressed mode, though the latter has a cps rate over 3½ times greater than the expanded mode.

The ThinkJet printer that I tested printed fifty 60-character lines (3000 characters, normal pitch) in 32.96 seconds, or 90.02 characters per second.

Hewlett-Packard is claiming a print speed of 150 cps at 12 cpi, but they are measuring only burst speed and are not including the time it takes for the print head to accelerate and decelerate at the beginning and end of each line, as well as the time to advance the paper one line. To confirm this, I printed fifty 50-character lines (2500 characters) at the normal pitch, 12 cpi. This took only 29.7 seconds, which means that the additional 500 characters of the first test took an additional 3.26 seconds (32.96-29.7), for a burst speed of 153.37 cps at normal pitch.

CONCLUSIONS

I used the ThinkJet with a prerelease version of WordStar for the HP 110 portable computer. All functions are supported except for

microjustification and variable line height, as would be expected. I printed subscripts and superscripts using the printer's half-line feed function, as no reverse line feeds can be done. But the ThinkJet's ability to print bold and underlining (or both together) in one pass does speed up printing documents containing these attributes. Most dot-matrix impact printers print bold and underlining by overprinting, sometimes several times, and this cuts throughput dramatically in documents containing many of these attributes.

Although Hewlett-Packard provides remedies for unclogging clogged print heads, I had no such trouble while testing the printer, even after it was left sitting unused for two weeks. Changing the cartridges couldn't be easier, and HP even provides you with a new print head.

The 2225B battery-powered ThinkJet printer makes a nice addition to Hewlett-Packard's portable line. The other two ThinkJet models compare favorably to others in their price range. They are quiet, compact, lightweight, and provide enough features to make them useful for most applications. Together with the HP 110 portable computer and the HP 9114A disk drive, the ThinkJet printer completes the loop, so to speak, on a powerful portable computing system.

Mark Haas (2600 Tenth St., Berkeley, CA 94710) is the technical director for Osborne/McGraw-Hill.

ThinkJet
Portable Ink-Jet Printer

by Barry Scheur

The ThinkJet printer is a unique portable printer because of its high-quality print, low noise level, and disposable ink cartridges. There are, however, several disadvantages for the blind operator: (1) there is no way to know if the ink cartridge has clogged and is not printing (I have printed fifteen pages with nothing coming out on paper before someone alerted me); and (2) there is no way to tell that the print quality is fading when the ink runs down. There is an "ink out" sensor, but the print quality seems to fade as you get nearer to the end of the cartridge. Finally, you are prone to get ink on your hands--and consequently other things as well--which you may or may not discover.

If you decide to buy this printer, make sure the model you purchase can be interfaced with your system. There have been rumors of a three-month waiting period for models with serial interfaces.

Gemini SG-10
Dot-Matrix Printer

by Henry Brugsch

PRODUCT: Gemini SG-10

SOURCE: Star Micronics Inc.
200 Park Avenue
Suite 3510
New York, NY 10166
(212) 986-6770

PRICE: $299 includes one-year warranty

REVIEWER'S NOTE

This review is based on my experiences with the Gemini 10-X, the predecessor to the SG-10. The SG-10 has just arrived on the market; I received my unit just as I was putting together the pieces for this review.

STAR MICRONICS PRINTERS

Star Micronics printers are marketed as an inexpensive alternative to higher-priced printers of equivalent print quality. This aggressive marketing strategy insures that the Star Micronics printers are priced lower than competitive printers and are, therefore, seldom heavily discounted. Imagine that the SG-10, with added features, is actually $100 less than the Gemini 10-X.

SPECIAL FEATURES

The Gemini SG-10 comes with a standard parallel interface, with an option for a serial port. It weighs just about 15 pounds and is

the size of a talking book machine. The SG-10 has the ability to produce most basic character sets and can interface with both the IBM and Apple computers, as well as others.

This printer is very easy to operate, although the controls were easier for a blind person on the 10-X than they are on the SG-10. The ON/OFF switch is the same, but the ON-LINE/OFF-LINE, PAPER ADVANCE, and LINE FEED controls on the SG-10 are membrane or flush with the surface. You can feel a nob underneath the surface if you try, but I would recommend putting some nail polish or braille tape on the surface to locate them. The DIP switches are accessible and are used to control such things as auto-line feeds, desired character set, or parameters.

The SG-10 has several features not found on the Gemini 10-X. For one thing, it comes with a 2K buffer (an option on the 10-X), which is expandable to 6K. For IBM lovers, the SG-10 has a special mode called "IBM" which, as the name implies, gives you IBM character sets and IBM graphics when used with IBM hardware and software.

Another interesting feature of the SG-10 is the self-test. An easy test to administer, the user simply depresses the LINE FEED and ON-LINE keys while the power is turned on, and the printer begins to print out its entire character set. This alerts the user to any potential problems before printing the actual document.

I have been told that the cover on the SG-10 has been improved as well. There's a general saying in the field that any user who still has a Gemini printer cover intact, isn't using the printer. The cover on my 10-X self-destructed after three days. The plastic on these older covers was so brittle that any sharp blow would crack them.

Apparently, the cover on the SG-10 is sturdier, which would put an end to an old saying.

Finally, the feature that prompted me to buy a Gemini printer in the first place is the fact that it uses standard typewriter ribbons, costing just $2.50. (Make sure it says "good for dot-matrix printers" on the box.) People often forget about the additional cost of printer ribbons or cartridges, which can be quite expensive to replace. You insert the ribbon just like you would on a standard typewriter by locking it in place and threading it around several posts. This requires sighted assistance the first time, but after that you can learn to do it yourself.

PRINT QUALITY

It is in the area of print quality that the SG-10 has been substantially upgraded. The SG-10 boasts of a near-letter-quality (NLQ) mode which is, indeed, close to letter-quality printing. In the NLQ mode, the print head moves in such a way as to fill in the spaces between dots which you find with dot-matrix printing. This is no different from the correspondence modes of other printers, but according to the manufacturer, they have taken it one step further in improving the print quality. The material I received from Star Micronics did show an improvement over the Gemini 10-X.

PAPER HANDLING

I have had little difficulty manipulating the paper on my 10-X. It comes with a tractor feed for continuous-feed paper, or you can

remove the tractor feed for single sheets. However, as is true with most low-cost printers, it doesn't work as well without the tractor feed. The paper is fed into the machine like a normal typewriter. Unfortunately, when single sheets are fed into the machine, they tend to skew after a while and the printing comes out crooked. This is not a problem when using the tractor feed with continuous-feed paper. The SG-10 has an option for bottom-loading to accommodate fan-fold paper.

The machine also has an out-of-paper alarm, but I find little use for it. If the machine is running out of paper, the alarm goes off and the printer stops six lines before the end of the page. I find this annoying if I want the last page printed, so I generally disable the alarm and estimate the amount of paper I need. It's a matter of personal choice.

FINAL COMMENTS

I have had great success with the Gemini 10-X. It is reliable and inexpensive to operate. The major disadvantage of this printer, and the same is true for other dot-matrix printers in this price range, is the noise level. The sounds are similar to those you might hear in a dentist's office. To its credit, with the improved cover, the SG-10 is quieter than its predecessor, and I can actually talk on the phone or work in the same room while the printer is running.

For $299 and with such additional features as near-letter-quality printing, IBM character set, 2K buffer, and an improved cover, the SG-10 represents a very good buy.

Epson FX-80
Dot-Matrix Printer

by Richard D. Wright

PRODUCT: Epson FX-80

SOURCE: Epson America Inc.
23530 Hawthorne Blvd.
Torrance, CA 90505
(213) 373-9511

PRICE: $499

SETTING THE STANDARD FOR DOT-MATRIX PRINTERS

The Epson FX-80 is one of a series of moderately-priced, high-speed printers manufactured by Epson America Inc. Due to the popularity of Epson's dot-matrix printers, and because of the company's policy of using similar control codes in the ROM of successive generations of printers, these machines are perhaps the nearest thing to an industry standard for dot-matrix printers.

Several software programs have been written exclusively for, or including the Epson FX-80 for setting up and changing fonts. These programs enable a user to configure or change type styles selectively.

My own experience, and that of other users I know, confirms that the FX-80 is an exceptionally reliable and versatile printer—even when subjected to heavy use. This reliability is based, in part, on the fact that the FX-80 represents an improvement upon rather than departure

from earlier designs. Also, the design of the printer includes few external parts which could be damaged.

USING THE FX-80

The FX-80 is driven through a parallel port using a standard parallel cable. I have personally driven the printer with an Apple parallel card, an Orange Grappler card, and a Print-it! card—all on an Apple IIe.

The unit contains few external controls. As the user faces the printer, there is a power switch on the left hand side of the case, near the rear, and three buttons and four green indicator lights on the top of the machine near the right front edge. The paper roller knob is located on the right hand side about midway between the front and the rear.

The printer will accomodate cut-sheet, roll or pin-feed fanfold paper. Installation of the different types of paper and of the cartridge ribbon are described in the accompanying manual. These operations are only moderately difficult, depending on the individual user's dexterity.

You may wish to seek the assistance of a sighted person when installing the ribbon. The ribbon cartridge must be properly placed for the ribbon to work. It may also be necessary to adjust the tension of the ribbon with the small knob on the left side of the ribbon cartridge. The problem is that the printer may sound like it is printing even when the ribbon is not properly placed.

The green LEDs are of little use to a blind person. These LEDs indicate POWER, READY STATUS, PAPER OUT, and ON LINE. It is possible

to infer these conditions in other ways. Since the printer makes a slight noise when the power is on, the POWER indicator is not necessary. Similarly, I have found little need for the READY indicator. PAPER OUT is also indicated by a buzzer which has other functions as well. ON LINE/OFF LINE can be determined by toggling the ON LINE/OFF LINE button. This button, one of the three mentioned before on the top right side of the machine, is grouped with the FORM FEED and the LINE FEED buttons. These two buttons will only function when the ON LINE/OFF LINE button is toggled to the OFF LINE position.

The buzzer, located inside the unit, is designed to indicate a number of conditions including PAPER OUT, short circuit, abnormally high voltage, or error in the slave CPU. Specific conditions are indicated by combinations of long and short tones emitted by the buzzer.

As mentioned previously, the FX-80 is capable of reproducing a number of fonts and printing styles as well as foreign characters and very good graphics. Many of these display characteristics can be controlled by software, through escape and control sequences entered at the keyboard, or through switch settings.

One of the few complaints I have with the FX-80 is with the location of the switches. The "switches," as the manual calls them, are actually switchbanks located inside the machine. The "switches" or switchbanks may control a number of functions such as column length, ZERO font, paper-end detector, input buffer, print mode, POWER ON, international character set, "select in" signal internally fixed or not fixed, buzzer, one inch skip-over perforation, and automatic line

feed. In order to change these settings from the switchbanks, it is necessary to disconnect the AC cord and use a screwdriver to remove a cover. When using an Apple, I have not had to change these switches since most alterations could be controlled by the software. I did encounter a problem with my Radio Shack Portable 100. The Tandy 100 does not generate line feeds and has no provision for including them in its text program in ROM. Therefore, it was necessary to remove the panel and turn on the line feed switch after carriage returns. There is a potential for damaging other internal parts in this operation, so I would not want to perform it on a regular basis.

MAINTENANCE AND SERVICE

The FX-80 requires little service. The owner's manual recommends a soft brush to remove paper dust every three months. It also suggests a mild detergent and water to clean exterior surfaces. As with any electronic device, I urge extreme caution when using water, not to mention the necessity of disconnecting the AC power cord.

There are some user replaceable parts such as the print head; more serious service problems require a trip to the Epson dealer. My FX-80 has never required dealer or factory service. But a friend of mine tells me it can be expensive and can take a long time.

COMMENTS & CONCLUSION

Overall, I have found the FX-80 to be durable, reliable, and relatively easy to use. With the introduction of newer models, like the Epson FX-85 and LX-80, prices for the FX-80 have dropped down.

If you shop around, this printer can be an excellent buy.

Editor's Note: The Epson FX-80 has been replaced by the Epson FX-85 which retails for the same price. The FX-85 has a larger buffer (8K instead of 2K), an IBM-character set, and a near-letter-quality font. The most significant new feature is its "select-a-type" which is a keypad on the front which allows a user to change type fonts by pressing buttons, rather than through software. The keypad gives off a series of beeps to indicate the particular type font being selected.

Okidata 192
Dot Matrix Printer

by Matthew Chao

PRODUCT: Okidata 192

SOURCE: Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
(609) 235-2600 or (800) 654-3282

PRICE: $499 for parallel or IBM-compatible
$578 for serial interface

RUNNING THE GAUNTLET OF COMPUTER PERIPHERALS

Finding the right computer system and its associated software and peripherals is a painful and time-consuming process. A visually impaired buyer must deal with the traditional computer manufacturer hype, and run the gauntlet of voice/speech programs and peripherals that are practical for a blind user.

This process can be truly exhausting. I know. I spent over a year looking at computer equipment until I came up with the best system for me. Fortunately, I am now in a position to evaluate equipment for others—including my favorite low-cost printer.

THE OKIDATA DOT MATRIX PRINTER

The Okidata Model 192 is a small, near-letter-quality, dot-matrix printer. It is the size of a small electronic typewriter weighing about 10 pounds. Designed for compatibility with the IBM PC and look-alikes, this printer has a speed of about 33 characters per second (CPS)

in the near-letter-quality mode, and can be used in either the tractor-feed mode, or with separate sheets of paper just like a typewriter.

But what sets this printer apart is its tractor-feed design. The tractor-feed gears are on the roller/platen, thus eliminating the need for a separate tractor-feed attachment. All you have to do is place a sheet of paper under two guides on the back of the printer and slowly roll it in until the gears grab the holes in the tractor-feed paper.

Maximum width of the paper is nine and a half inches, which includes the holes for the tractor feed. If you want narrower widths, an optional adjustable tractor feed is available for $60.

SETTING UP THE OKIDATA

The printer comes partially disassembled; you must put the end of the roller into the printer, as well as install the ribbon cartridge. The ribbon is a loop-type, which means that it will continue to go around in the cartridge. This feature can be both a blessing and a curse: a blessing because it will not tangle and there is no complicated ribbon path, and a curse because you could continue to use a worn-out ribbon unless someone with vision comments on the print quality of your reports (hopefully, not your boss).

In addition to installing the ribbon and putting in the end for the roller, you must hook up the printer to your computer. This is when you might want some sighted assistance. The printer connects to the parallel port of the computer (which usually is part of the monochrome card). A small regular tip screwdriver is required to hook up the printer. The printer end of the cable slides into a slot and is held in place by two

clips. Once you have connected the printer to your computer, you are ready to begin.

The Okidata 192 comes with two different covers: one for the single sheets of paper and another for the tractor-feed mode, which is designed to deaden the printer noise and to keep fingers and objects out of the way of the print head.

After you have chosen the appropriate mode of operation, rolled up the paper, and put on the proper cover, you are ready to print. You simply turn on the printer, issue the proper commands to your software, and begin to print.

Incidentally, the printer has a self-test routine which is activated by pressing the line feed button while you turn on the printer. However, it will not stop automatically after one page. You have to shut down the printer and restart it, or press the on-line button to stop the self-test. The printer can be taken off-line to perform functions such as loading paper and fixing jams which happen from time to time.

As you look at the front of the printer, you see four buttons. The button on the far left is the LINE FEED button. Pressing this button advances the paper one line at a time. The second button from the left is the PAGE FEED line which advances the paper approximately one page. You must line up the paper correctly first for this to work right. After your document has been printed, the printer will automatically advance to the next page.

The third button from the left is the MENU SELECTION button for possible print type styles. I have not been able to take advantage of this feature yet. The last button allows you to put the printer ON-

or OFF-LINE. While there is a light to indicate which mode you're in, the only way a blind person can determine the mode is by knowing whether the printer will print. If the printer doesn't print after you have given the proper commands, you are probably not on-line; that is, your printer is not communicating with your computer.

USING THE OKIDATA 192

Learning to use this printer is relatively easy and takes only a few minutes. The ribbon cartridge is easy to load, and there are tactile guides to help you. In addition, the cartridge is shaped so that it will only go in one way—it would be very difficult to get it wrong.

The only other thing you must do prior to start-up is to make sure the switch next to the ribbon cartridge is in the center position. When you are ready to print, you use the parameters (printer instructions) that match the IBM Graph printer.

Printing in the near-letter-quality mode takes longer than printing in the draft mode. This is because the printer is striking each letter twice to fill in the gaps which dot-matrix printers make. Even so, this printer is fast and relatively quiet. It buzzes like many other printers of this type, but in my opinion, the noise is tolerable. I have often talked with people on the phone while the printer is running without having to raise my voice.

COMMENTS & CONCLUSIONS

The Okidata 192 is easy to use and relatively problem free. Since purchasing my printer in July, I have had three paper jams which were due, in part, to my unfamiliarity with the tractor feed. The only serious problem I had was when some paper caught in the roller and it was impossible to move the print head to do a self-test. However, with some assistance from my brother, the paper was removed and the printer performed satisfactorily.

In closing, I would recommend this printer for those who want near-letter-quality printing but who can't afford a daisy-wheel printer. It is lightweight and compact--an important feature if you're short on desk space. The tractor-feed option allows you to load paper either from the top or up through the bottom. If you are using a printer stand, bottom loading is easiest.

My only major criticism is that the power and cables are inconveniently located at the back of the printer and just below where you want to put the tractor-feed paper. Also, this printer does not have an out-of-paper alarm--a handy feature for a blind operator.

To sumarize, the Okidata 192 is a "no fuss, no muss" printer.

Dot Matrix Plus Bells & Whistles
Proprinter 4201

by Robin Nelson

Reprinted with permission from Personal Computing, September 1985, page 132, copyright 1985, Hayden Publishing Company.

PRODUCT: Proprinter 4201

SOURCE: IBM
Information Systems Group
900 King Street
Rye Brook, NY 10573
(914) 934-4488

PRICE: $549

Much was made at the time, several months ago, of IBM's cutting its primary ties with Epson, which had supplied the dot-matrix printers IBM was selling to personal computer users under its logo. The 4201 Proprinter is Big Blue's first upgrade of its Epson-supplied printers, as well as the first tangible expression of the idea that, well...we can do it better.

The result, as expected, is: Yes, for a price. The Proprinter is a a sturdy, serviceable machine, but certainly nothing lavish or overbuilt. Nor is its operational whine any less irritable than that of most lower-cost dot-matrix printers--it may even be louder than some. It requires a little more patience to load continuous-form paper than most, but offers a convenient front-load option for single sheets and envelopes. So, one has to be in a position of needing most of the features offered

to justify IBM's list price of $550 for a nine-wire dot matrix.

At a nominal 200 cps (not precisely timed for this evaluation), the Proprinter's output approximates the qualities--or imperfections, if you will--of typical, older dot-matrix printers offering 120-140 cps performance. So there is some speed gain in standard operations.

Its most significant extras center on the versatility of multiple print modes and character widths--condensed, 10 or 12 cpi and extra-wide --plus extra, "down-loadable" character sets (not currently available from IBM). The Proprinter's near-letter-quality mode actually does live up to that somewhat arbitrary definition: You get finely formed, very readable dot-matrix characters at a speed (40 cps) that is one-fifth as fast as the machine will print in "data processing" (IBM-ese for draft quality) mode. In fact, with a serif-type font that can be down-loaded to run in place of the normal dot-matrix character set, the eye can be momentarily fooled into thinking you've got a daisy-wheel going here--and even though the illusion may be short-lived, you could see this being used for correspondence.

Unfortunately, IBM's operations manual for the Proprinter refers to the near-letter-quality mode interchangeably with "double-strike"; but it is <u>not</u> the familiar double-strike offered by word processors like WordStar--which will simply give you a heavier dot-matrix imprint. Instead, you have to load the Proprinter's appropriate Escape sequence codes into two of the available user patches (accessible via WordStar's installation program) to get a true near-letter-quality printing function to turn off and on. (These are usually put into the patch available for changing ribbon colors if you were using a daisy-wheel printer.)

If you choose to install the near-letter-quality function this way in WordStar, three of the four remaining user patches must be devoted to superscript and subscript commands to achieve the half-height letters offered in the printer manual--a situation WordStar jockeys who use Epson printers will find familiar.

Likewise, the ability to use additional (down-loaded) character fonts on the Proprinter requires program patching--manageable with some word processors, totally frustrating with others. While IBM doesn't supply character fonts, it says third-party software developers are offering more of them, as well as revised word processors to support all Proprinter features.

After loading a font to the printer--you can use DOS for this--we squeezed all the features we could into WordStar (version 3.3), which meant choosing between condensed or double-wide characters as well as using the ribbon-color patch not for near-letter-quality switching but to invoke a down-load font in *near-letter-quality* mode. Thus, the command that cancels a down-loaded font also cancels near letter quality. This left us no way to switch near-letter-quality off or on with standard dot-matrix characters or double-wide printing, or sub-/super-script, or another patch-toggle feature to make room.

The point is, you need to examine your word processing software in considerable detail--something you probably should do anyway--before shelling out the extra dollars for a Proprinter and mating it to your system. But if you can support this kind of versatility and it makes sense for your mix of personal computing applications, IBM does offer a very well rounded dot-matrix package in the Proprinter, as well as

its traditional technical support--commensurate, of course, with purchase from an authorized dealer.

Proprinter
Dot-Matrix Printer

by Dick Gage

The Proprinter by IBM is a very versatile unit, offering near-letter-quality printing at a much faster rate than standard letter quality printers, or about 40 cps. In the correspondence mode, it is even faster, operating at well over 200 cps.

Paper loading is quite easy, although you may seek some sighted assistance the first time to ensure proper alignment of the paper. You can feed envelopes into the front of the printer without having to remove the paper from the printer.

This printer is a bit quieter than many other dot-matrix printers in this price range. It is particularly good in an office setting where you don't want to be distracted by printer noise.

It goes without saying that IBM supports its products, and the fact that this machine is manufactured in the United States might influence some buyers.

The Brother HR-15
Letter-Quality Printer

by Peter V. Callamaras

(Reprinted with permission from the November 1984 issue of BYTE magazine. Copyright © by McGraw-Hill, Inc., New York 10020. All rights reserved.)

PRODUCT: Brother HR-15 Printer

SOURCE: Brother International Corp.
8 Corporate Place
Piscataway, NJ 08854
(201) 981-0300

PRICE: $599

Choosing a printer is a big decision. Until recently, most of us opted for dot-matrix printers for two reasons: price and graphics capabilities. But most of us really want a letter-quality printer. After all, a word processor lets you produce professional-looking documents in a short amount of time, right? And a dot-matrix printout is, well, not that professional looking.

But technology has once again come to the rescue. Brother International Corporation's HR-15 printer is a reasonably priced ($599 list) daisy-wheel printer with a respectable speed (13 characters per second).

DESCRIPTION

The HR-15 is a well-designed, well-packaged, and rugged printer. The basic print mechanism is simple, yet solid. The design of the print hammer and daisy-wheel portion of the printer is based on that of

the popular Brother electronic typewriter line. The printer is encased in relatively thick, sturdy plastic.

There are six membrane keys on the front panel of the printer labeled Pitch, Line Feeds, Top of Form, Line Spacing, Select/Deselect, and Copy. You select options by pressing the corresponding key. The Pitch key gives you a choice of 10, 12, or 15 characters per inch plus proportional spacing. If you need an extended printout, you can get 225 characters on a single line of 8½-inch-wide paper by using the 15 pitch and the optional Quadro 15 print wheel. Line spacing can be set at single, one and a half, or double spacing. The other print options are self-explanatory.

You can use the Copy key to reprint material stored in the HR-15's 3K-byte buffer (8K-byte buffer optional). The buffer stores approximately a page of text. This page will be reprinted until you stop the copy function with the Select/Deselect key.

I had no trouble using the membrane keys, and they seem relatively impervious to damage from spilled liquids, etc.

Brother International offers a wide variety of ribbons and daisy wheels for the HR-15. They are standard Brother typewriter supplies, both plentiful and affordable.

The ribbons are encased in plastic, plug-in cartridges; they come in single-strike film, multistrike film, and reinkable fabric. When you get to the end of a ribbon, a buzzer sounds and an alarm light goes on.

Daisy print wheels are available in most standard fonts, including Prestige, italics, script, optical-character reader (OCR), and others.

There is also a proportional daisy wheel that can be used in conjunction with the proportional-spacing setting on the pitch selector.

The HR-15 has standard typewriter controls such as the paper-bail lift bar, platen roller knob, and paper-release arm. It functions like an electronic typewriter converted for use as a computer printer.

To use the basic printer all you have to do is insert a sheet of paper, roll the paper to the start position, and press the Select/De-select key. You can buy the printer with either a parallel or serial connector on the back. If you buy an HR-15 with a serial-port connector, you will have to set the serial parameters via the DIP (dual-inline pin) switch on the back panel of the printer.

OPTIONS

You can add three options to the basic HR-15 to enhance its capabilities. The most useful of these options, in my opinion, is the tractor-feed mechanism, which retails for $150. It fits into a set of guides built into the printer. Slide it into the guides, plug the paper-out sensor plug into a socket on the back of the printer, and it's set up. The unit works well with microperforated fanfold printer paper. Your final product will look like it came from a dedicated typewriter.

Included with the tractor-feed mechanism is a large plastic noise-reduction cover that replaces the unit's standard noise-reduction cover. Although either cover reduces the noise level somewhat, I prefer to put the printer in a noise-reduction enclosure because even when covered, the printer is loud.

The cut-sheet feeder option, priced at $259.95, is an alternative to the tractor-feed unit. This feeder is designed to mate with preformed installation holes and guides on the back of the printer. With this option you can insert a stack of letterhead stationery into the mechanism and it will automatically feed the sheets to the printer. This is handy if you send a lot of form letters or if you do a lot of single-page revisions. When I tested the cut-sheet feeder, I had no significant problems.

The last HR-15 option is a $200 plug-in typewriter keyboard. This keyboard changes your HR-15 printer into a fully correctable typewriter. It has 96 standard character keys and some special controls. All the print functions are controlled from the keyboard when the Select switch is on. You can set the keyboard to operate in three different formats, depending on the print wheels you are using. For example, if you are using the international print wheel, you can use the English symbol for pound sterling (£) to denote currency. All the alternate symbols (as many as four on a key) are printed on the appropriate keys.

The keyboard has three different resting angles so you can adjust it to your most comfortable typing position. Overall, the keyboard's feel, layout, and switch locations are excellent. I had little difficulty switching between it and an IBM Selectric typewriter, despite the HR-15 keyboard's extra function keys and switches.

OTHER FEATURES

The HR-15 has a second ribbon holder that can hold a correction ribbon when the optional keyboard is installed. (Unfortunately, the

keyboard manual does not tell you what type or size of correction ribbon to use.) You can also use a different colored ribbon in the second ribbon holder for two-color printing capability (when using WordStar, for example).

The HR-15 prints at a rate of 13 characters per second (I did some tests that confirmed this measure). I don't think this speed is objectionable, even when printing long documents. However, I recommend that you use either an onboard or outboard printer buffer to free up the computer when you are printing long documents.

I used WordStar versions 3.1 and 3.3 on my Columbia PC and the printer did not disable any WordStar features that I usually use. I did not, however, run exhaustive tests on the HR-15/WordStar combination because I did not have access to some of the other popular word-processing programs to use for comparison. I did use the HR-15 and WordStar on an Apple II (as well as on the Columbia running the IBM version of WordStar) and again I had no problems.

When combined with WordStar, the printer let me easily change print wheels whenever I wanted a different typeface. The Brother daisy wheels come in plastic carriers that are designed to slip in and out of the print mechanism. It takes about four seconds to change daisy wheels. Open the print unit's cover, press the print-wheel release, pull out the original daisy wheel by the built-in finger tab, insert the new wheel, and close the cover. One thing about this procedure did bother me: there is a chance you might damage the unit's cover when you open it to access the print mechanism. The cover is supported on either end by two hinges and the distance between them prevents the cover from being as

sturdy as I would like it to be because I might change print wheels several times when printing a single document.

The printer and the optional hardware come with instruction manuals. On the whole, the manuals provide good installation directions, but inexperienced users may find them somewhat difficult to understand. My impression is that they were written primarily for installation technicians and experienced users.

CONCLUSIONS

The HR-15 currently is very popular in the marketplace: original equipment manufacturers are buying the Brother unit and repackaging it under their own label. The Comrex CR-11 and Dynax DX-15 are examples.

The Brother HR-15 is one of the best low-cost daisy-wheel printers you can buy today. It is sturdy and easy to use. It has a set of six controls that you would expect to find only on much more expensive printers.

The HR-15 is a medium-speed printer that should meet the needs of most personal computer and small-business computer users who want to produce letter-quality documents.

The keyboard option for the HR-15 turns the printer into a fully correctable typewriter, but for most people the tractor-feed unit will probably be the most popular option. The cut-sheet feeder is also useful if you use letterhead stationery often.

The Brother HR-15 gives you exceptional value for your dollar. It could very well become the standard for letter-quality printers in the same way the Epson MX series has become the standard for dot-matrix printers.

Peter V. Callamaras (POB 408, Scott AFB, IL 62225) is an officer in the Air Force. The recipient of degrees in computer technology and biological sciences, he recently received his master's degree in systems management. He has been interested in computers since 1966 and used to be the service-department manager of a computer store.

Brother HR-15
Daisy-Wheel Printer

by Dick Gage

If you're looking for a letter-quality printer, the Brother HR-15 may be just the printer you need. I have never regretted this purchase and find it especially practical for a blind operator. Perhaps the only real competitor in letter-quality printers in this price range are the Epson and IBM printers.

One strong advantage of purchasing this printer is the fact that the manual is available in braille from National Braille Press for just $10. And, the manual easily describes how to use this handy device. Paper loading is easy and straightforward, although it's important to have the paper aligned properly.

As is common with most printers, the DIP switches are rather small and closely configured; sighted assitance may be necessary to set the switches the first time.

The quality of print is very good and readable with an Optacon. It looks very much like typewritten output, and the type styles can be varied by purchasing different print wheels.

Print speed is approximately 12 cps--not very high, but acceptable for personal use. If time constraints in the work place are severe, you may need a faster alternative.

Shop around before you buy; this printer is available at much lower prices than list. Also look at some competitive models, such as

the Epson letter-quality printer for under $300. But if you do choose the HR-15, you will probably be pleased with the results.

Editor's Note: The Brother HR-15 is still being sold as the HR-15XL. The only difference is the print speed which is now 17 characters per second instead of 13. The Brother HR-25 is the same as the HR-15XL except that it has a wider carriage (now 132-column width) and a faster printing speed (23 cps).

DIABLO 620
Daisy-Wheel Printer

by Barry Scheur

PRODUCT: Diablo 620

SOURCE: Diablo Systems Inc.
POB 5030
Fremont, CA 94537
(415) 498-7000

PRICE: $950

The Diablo 620 is a daisy-wheel printer which has been on the market for over three years, and has proven to be reliable and durable. The printer resembles a workhorse: It is massive (slightly larger than an old style IBM Selectric typewriter) and it can chug out page after page of excellent quality print with few breakdowns.

For a blind person, several features should be noted:

(1) The DIP switches are both accessible (once you remove the front cover) and distinguishable (that is, you can find the one you want to change). There are eight of them in a vertical row. Unfortunately, as with most printers, the status indicators (On-line/Off-line, Pause, Line Feed) are touch-sensitive controls and are not marked for easy identification.

(2) The manual is available in braille from National Braille Press.

(3) Ribbon replacement is relatively easy. It involves removal and replacement of a cartridge ribbon. The cartridge snaps in place and the ribbon itself is positioned like on a typewriter. It may help to have some sighted assistance the first few times you do this. The "daisy wheel" is easily replaceable.

(4) The printer does not come with a tractor feed. One is available as an option for several hundred dollars. This means that you will constantly have to change paper which, on long documents, could prove tedious.

(5) The speed of this printer is approximately 18 cps. This is slower than some daisy wheels at comparable prices. What you are paying for with this printer is both reliability and the Diablo name, now owned by Xerox.

Waiting for Good Print
Wheelprinter & Quietwriter

by Peter Norton

(Reprinted from PC Magazine, May 28, 1985. Copyright © 1985 Ziff-Davis Publishing Company)

PRODUCT: Quietwriter Printer 5201

SOURCE: IBM
1 Culver Rd.
Dayton, NJ 08810
(800) IBM-2468

PRICE: $1395

I suppose we're all looking for the perfect printer. If that seems like a pretentious, metaphysical statement, well, what can I say? I'm still looking for the perfect printer for my PC, and I've yet to find it. To heck with perfect; just satisfactory is hard enough to find.

As always, I'm a fan of IBM, and I was very interested when, some months ago, it announced a couple of decent-looking printers. Before this, all that IBM had offered for PC printers was a series of practical but crappy dot matrix printers. While the best letter quality printers there are--the NEC Spinwriters--got a sort of official seal of PC approval from IBM, that wasn't really enough. IBM's a class act, and it needed something better.

THE NEW PRINTERS

Enter IBM's dreadfully named Wheelprinter and Quietwriter Printer, two very interesting new printers for the PC family. I loved them on sight and immediately treated myself to a Quietwriter. There is a lot that I like about the Quietwriter, and this column should be taken as an extended sales pitch for it--I think you probably ought to get one. Even though I think you ought to get one, the main thing I'm going to talk about is the disturbingly long list of things I don't like about the Quietwriter. I'm going to tell you about what's wrong with it, so that when you get around to buying one you won't be disappointed with its flaws (as I was).

Despite the fact that IBM developed several printer technologies, including the venerable Selectric golfball and the ink jet printer, the company has been hurting in recent years for anything up-to-date in either typewriters or small computer printers. It obviously noticed that fact and attempted to come up with a coordinated solution. Out came a series of three typewriters and two computer printers based on two different print engines. One engine is a conventional daisywheel, which is the basis for two of the typewriters and the Wheelprinter. The other engine is a technical innovation that in effect marries a thermal printer to a letter quality carbon ribbon. It produces remarkable print quality and is the basis for the third typewriter and the Quietwriter Printer.

The Quietwriter print mechanism basically melts a film ribbon of ink onto paper, noiselessly. Its print images are generated electronically, essentially as a super-high-resolution dot matrix impression

(you can't see the dots). The result is that the Quietwriter can print the full PC font.

PAPER-HANDLING PROBLEMS

While it's pretty terrific, there are some problems. One of them is that the Quietwriter and its Wheelprinter brother don't share the same paper-handling design. While the Quietwriter has the nifty printing mechanism, it's the Wheelprinter that has the slickest paper handling. In one tidy, compact, and elegant design, it handles single sheets, cut-sheet feeding, and continuous pin-fed paper.

The Quietwriter, on the other hand, uses a large, clunky separate tractor mechanism to pin-feed paper. It plugs into the printer electronically--which makes taking it on or off more of a chore and changes the behavior of the printer in some annoying ways. People think that they can get along without using a tractor to feed continuous forms into their printers, relying instead on the rubber platen to run the continuous paper through without its getting out of alignment. That works on lots of printers, but the Quietwriter doesn't have a platen that's precise enough to work that way. With the Quietwriter Printer, you need the tractor, clunky or not.

The Quietwriter seems to print both quickly and quietly, but there is some disappointment here, too. Because of the fancy thermal/carbon printing process, it can only print left to right--not back and forth the way most modern printers can--so all those nonprinting carriage returns slow down the printing speed.

The print speed is again compromised by the Quietwriter's ribbon-conservation techniques. If it's passing over more than two spaces, the ribbon and print mechanism are lifted off the paper. This process makes a soothing but distinct noise, and it also considerably slows down the printing. Not only does the print mechanism stop dead when the ribbon is moved on or off the paper, but it actually backs up slightly. All that motion slows things down. When I first test-drove the Quietwriter, it looked good printing out a paragraph of continuous text. But with anything discontinuous--like a column of figures, such as accounting or spreadsheet data--this beast really slows down. This can be a problem even with text--if you're having your word processor justify the text, it ends up with triple-spacing between words.

I quickly found out why the Quietwriter Printer works so hard to conserve its ribbon, though. It goes through them pretty fast, and, at about $12 a pop, it isn't particularly cheap. Since this is a new printer technology, the ribbons are only made by IBM--but even when competing sources appear, the price isn't likely to be much less thanks to the high-tech elements embedded in the ribbon design. When was the last time you spent $12 for a typewriter ribbon?

FONT CARTRIDGES

However, the biggest thrill and the biggest heartbreak come together in one special feature of the Quietwriter: its electronic font cartridges. There are four PC fonts available, plus numerous typewriter fonts, for $50 each. Again, IBM is the sole source for these cartridges.

The four special PC fonts have the full 250-odd extended ASCII characters that your PC uses, so that you can print anything on the screen, including the boxdrawing and other graphics characters, the card suits, and the happy faces. It's great to have a letter quality printer that can print all the PC characters. What's more exciting is that the Quietwriter can hold two font cartridges, so you can switch between them with a few simple printer control codes.

Now comes the heartbreak. Among the many available font cartridges, there isn't one that breaks out of the stodgy typewriter-face mold to give you a real high-quality typeset look. Here you have a printer that has the ability to produce any classic typeface that you see books printed in, and the unimaginative folks who produce these font cartridges give you the same old "blah" typewriter faces. It wasn't as if IBM were only making one or two cartridges so it had to stick to basics. IBM is offering plenty of font cartridges that give you just about every imaginable variation on a typewriter face--every variation, I'm sorry to report, but the one you really want.

NO ITALICS

Now, if you've got a printer that has removable font cartridges, you'll be glad to have a little variety in getting different sizes, such as pica and elite, and different styles, such as Courier and Prestige. But if you've got two fonts on line at the same time, what do you really want that second font for? To mix pica and elite? Who's kidding whom? What everyone wants for his second on-line font is italic, and it pains me to say that there isn't one Quietwriter italic font.

As I've said, I've found a lot of things to grumble about with the Quietwriter Printer, and I haven't exhausted the list. There are a few annoying things, like the lack of a platen knob to let you quickly and easily adjust the paper. Instead you adjust the paper by taking the printer off line and pressing buttons to move the paper up and down—a petty nuisance, but still a nuisance.

A QUIET WINNER

All problems with the Quietwriter Printer aside, you still get an unbeatable combination of true, honest-to-gosh letter quality, the full PC character set, and no noise pollution. Short of a high-priced laser printer, you just can't get that combination in any other printer, period.

In the end, it's the quietness of the Quietwriter Printer that really does it for me. How can you live with the noise of a conventional dot matrix or daisywheel printer when you're trying to get some work done? You can't, and that's the major reason why this printer is a real winner over its noisy competitors.

The Quietwriter
Letter-Quality Dot-Matrix Printer

by Dick Gage

The Quietwriter is, above all, quiet. Its print quality rivals that of most daisy-wheel printers, but then so does the price.

Peter Norton's article highlights the Quietwriter's good and not-so-good features. It is not difficult for a blind operator to use, although the control keys are membrane and the LEDs are of no use. It does have a beeper that reminds you to change the ribbon, plug in a ROM-cartridge-based font, or add paper.

Regarding the paper feed, you can buy a pinfeed mechanism for $75 and a cut-sheet feeder for $350. The Quietwriter comes with a standard IBM parallel interface.

The printer is not inexpensive to operate; as mentioned previously, the ribbons cost $12 and last for 160,000 characters or a little over 133 double-spaced pages. The price comes down a bit if you buy in bulk.

With a price tag of $1395, the Quietwriter is perhaps best suited to an office setting where noise levels and professional output are critical.

CHAPTER 5

Selecting a Speech Synthesizer

CAN WE TALK HERE?

by Dick Gage & Don Breda

Ask twenty people using six different speech synthesizers which one is best and you'll get six different answers. People are as subjective about their speech synthesizers as they are about stereo components. That's because choosing the right synthesizer depends on such variables as your particular computer, your specific application, your personal preference for sound, the speed at which you listen to text, and so forth.

The best we can do in this article is to give you some criteria for selecting a speech synthesizer, and list some possible options at the end of this section. If you own an IBM PC, your choices are many; if you own a Radio Shack Model 4, on the other hand, you have but one choice. But regardless of which computer you own, one thing is certain about all speech synthesizers: each has its own individual voice personality. The Echo family have a sing-song quality and implied inflection when reading text. The Votrax family, and some units from Intex and Microvox, have a flat-tone quality which some people prefer. When it comes to the higher-priced speech synthesizers like DECtalk, everyone agrees that the speech sounds almost human — it's the price that will send you wheezing all the way to the bank.

An excellent review of voice output devices appeared in Aids and Appliances Review, Issues No. 9 and 10, published by the Carroll Center for the Blind. We suggest you send for a cassette copy to supplement this article.

The following criteria should be considered when choosing a speech synthesizer:

(1) Adaptive Software

One of the more important criteria for selection is the availability of adaptive software. Without adaptive software to provide for CRT screen review and cursor control feedback, the user who attaches a synthesizer to their computer will simply hear the speech spoken in a linear progression. While a sighted person can scan the screen for pertinent information, a blind person using a speech synthesizer is limited to a word-by-word review and then it's gone. To review the material, they must regenerate it by repeating the commands that created the text in the first place.

Special adaptive software provides the necessary review functions to overcome this limitation. Such software enables blind users to selectively access needed information while skipping over the superfluous. With the appropriate software, the user can instruct the computer to repeat characters, words, lines, or entire sections of text. Users can have the computer verbalize corrections, identify columns, or skip repeated characters.

This article will not review all of the different special adaptive programs on the market; this subject was covered in the last computer book, The Second Beginner's Guide. Suffice it to say that all parts must be compatible: your computer, your special application software, and your speech synthesizer. Some possible combinations are listed at the end of this section.

(2) Port Availability

A speech synthesizer must be attached to a computer port, such as a printer port which would easily receive information sent from the screen. If your computer only has a serial port, obviously you will need a synthetic speech device with a serial port as well. Some inexpensive speech synthesizers have both serial and parallel ports; this is a nice feature because it allows you to use the same synthesizer with several different computers. Some computers also have both ports or even multiple ports; but if your computer only has one serial port in addition to a parallel port, you may prefer not to hook a synthesizer to the serial port which is also used for modem interface.

(3) Command Structure

Synthetic speech devices have commands built into them which you can use to tell the speech device to "shut up," for example. Unfortunately, there are no standards for command structures among speech synthesizers. This means that the manner in which you tell one synthesizer to "shut up " is not the same for another. This applies to both high-end and low-end units.

The important point to remember here is that your speech software must be compatible with the command structures available through your speech synthesizer. Some typical commands are: speed up, slow down, raise the pitch, lower the pitch, etc. The manual that comes with your synthetic speech device will tell you how to send these commands, but they will only work if your speech software allows them to.

Equally important is the fact that a synthesizer may not always have the variety of commands that you need. There are synthesizers on

the market that do not have commands built into them to tell them to be quiet, for example, and this could be a nightmare.

(4) Read Rate

When you first start using your speech synthesizer, particularly if it's a low-end unit, you will probably read at a slow speed. As the pronunciation becomes more familiar, you will want to increase the reading speed. You can become very unhappy with your unit very quickly if the reading speed cannot be altered. Check with the vendor to find out how many words per minute the unit can read. Some synthesizers claim an unbelievably high reading rate, but the truth is that at that speed they may clip or chop syllables so badly as to be misunderstood by even the most sophisticated user. This is particularly true of synthesizers in the Votrax group, or others that use the SC01 speech chip.

(5) Screen Review Features

Like most peripherals, what distinguishes one from another are the features they possess. In terms of speech synthesizers, the availability of "features" depends on both the synthesizer and the software being used with it. In fact, many features which were previously available as a function of the speech synthesizer have been taken over by special application software.

Because the availability of certain features is dependent on the combination of hardware and software, it is not practical to separate them out one by one. For example, the ability to instantly stop the voice on a word is a function of both the software and the speech synthesizer. The ability to verbally announce error corrections is

generally a function of the software, while unlimited vocabulary is primarily a function of the speech synthesizer.

Since you will probably be choosing a speech synthesizer after you have decided on a particular computer and adaptive software, check with the vendor to see which features will be available when adding that speech synthesizer to your configuration.

(6) Speech Quality

We left this criteria for last because it should generally be your last consideration. Despite your most serious misgivings upon hearing the speech quality of a low-end unit, it is true that you will become accustomed to the speech after a period of time. It is analogous to listening to a foreign language — it sounds more familiar as your ear picks up the nuances of the accent. I used a pair of earphones when I first got my speech unit and found this extremely helpful.

There are really only two choices for speech today: low-end speech at a low-end price ($40), and high-end speech for a high-end price ($4,000). Certainly, if price is not a factor, you might choose the high-end speech synthesizer, although what you're really paying for is improved speech. If you are teaching in a rehab setting where students are only in training or a short period of time and need to understand the speech quickly, you should probably purchase a $4,000 DECtalk. Or, if you're in telmarketing, you might want to take advantage of the DECtalk's built-in modem which allows the user to interface the synthesizer with the telephone.

But if you're like the rest of us, poor but willing to make the extra effort, you will probably opt for a low-end unit. Admittedly,

the speech is awkward and robot-like, but even robots have their own speech personality. Some people prefer the flat-sounding voice of the Votrax family of synthesizers. Other people find they quickly lose concentration and prefer a synthesizer with some voice inflection, like the Echo units. As a user, I have found that several hours of listening to a speech synthesizer — high-end or low-end — causes even the most diligent worker to doze off. (The same could be said for human voices.)

The problem with speech synthesizers today is that there is nothing in the middle — something offering good speech quality, a variety of features, and a moderate price tag. No matter how hard you try to make an intelligent decision about your purchase, you will probably have to make compromises in the end. Hopefully, sometime soon, the situation in this area will improve. Then, when Joan Rivers asks, "Can we talk here?" — the answer will be YES.

A QUICK AND DIRTY ANSWER

It never fails. No matter how hard we try to think things through. No matter how carefully we compare critical criteria. No matter how persistently we present pertinent, palpable information. As soon as the book goes out, the letters and phone calls start pouring in:

"Gee, loved your book. It sure had a lot of useful information. You folks really do a great job. But could you just tell me, please, which speech synthesizer should I buy?"

It never fails. So, in honor of techno-phobics everywhere—who just want the simple, straightforward scoop on speech synthesizers—we have prepared a list of recommended synthesizers to be used with certain microcomputers and special application software.

This does not mean that only one speech synthesizer works with that particular configuration; if you want to discuss the options, you should contact the software vendor. This Quick and Dirty Answer Chart was prepared by Joe Lazarro, Dick Gage, and Don Breda. To double-check their recommendations, we contacted the software companies for verification. There are other possible configurations, but these are tried and true.

RECOMMENDED SPEECH SYNTHESIZERS

Computer	Adaptive Software	Recommended Speech Synthesizer	
		Low-End	High-End
Radio Shack Model 4	Enable Reader ENABLE SOFTWARE COMPANY	Votrax PSI	DECtalk
Commodore 64	64 Reader ACCESS-ABILITY SYSTEMS	(speech synthesizer included)	
Apple IIe	Braille-Edit, BETTE RAISED DOT COMPUTING	Echo+	DECtalk
	Word-Talk	Echo+, Echo GP	DECtalk
	Work-Station	Echo+	———
	Talking Transcend	Echo+	———
	Braille-Talk COMPUTER AIDS CORP.	Echo+, Echo GP	DECtalk
	TVP	Echo+	DECtalk
	Words LARRY SKUTCHAN	Echo+	DECtalk
	Lister Talker CIDERWARE	Echo+	———
	Talking Terminal DECSCEPT	Echo+	———
Apple IIc	Braille-Edit RAISED DOT COMPUTING	Cricket	DECtalk
	Word-Talk COMPUTER AIDS CORP.	Cricket, Echo GP	DECtalk
	TVP COMPUTER AIDS CORP.	Cricket	DECtalk

Recommended Speech Synthesizers continued...

Computer	*Adaptive Software*	*Recommended Speech Synthesizer*	
		Low-End	*High-End*
IBM PC & compatibles	Enhanced PC Talking Program COMPUTER CONVERSATIONS	(user preferences vary; contact software vendor)	
	Freedom 1 INTERFACE SYSTEMS	Votrax PSS	DECtalk
	PC Speak MARK ENTERPRISES	Votrax PSS	DECtalk, Calltext
	Soft Vert TELESENSORY SYSTEMS INC.	Echo PC	Calltext
	Prompt Writer SYN-TALK SYSTEMS	Votrax PSS	-----
	Word-Talk	Echo PC, Votrax PSS	DECtalk
	Screen-Talk	Echo PC, Votrax PSS	DECtalk
	Braille-Talk COMPUTER AIDS CORP.	Echo PC, Votrax PSS	DECtalk

SPEECH SYNTHESIZERS

PRODUCT: Echo+, Cricket

SOURCE: Street Electronics Corp.
1140 Mark Avenue
Carpinteria, CA 93013
(805) 684-4593

PRICES: $150, $170

COMPATIBLE: Apple IIe, II+, IIc

PRODUCT: Votrax Personal Speech System (PSS)

SOURCE: Votrax Inc.
1358 Rankin
Troy, MI 48083
(800) 521-1350

PRICE: $400

COMPATIBLE: Almost any computer with a serial or parallel output port

---

PRODUCT: DECtalk

SOURCE: Digital Equipment Corp.
146 Main Street
Maynard, MA 01754
(800) 832-6277

PRICE: $4,000

COMPATIBLE: With a variety of computers

PRODUCT: Calltext 5000

SOURCE: Speech Plus
461 North Bernardo Avenue
Mountain View, CA 94043
(415) 964-7023

PRICE: $3,225

COMPATIBLE: With any computer with a serial or parallel output port as well as IBM PC and compatibles

---

CHAPTER 6

Paperless Braille Devices

Kentucky PortaBraille &
Kentucky PocketBraille

by Fred L. Gissoni

PRODUCT: PortaBraille or PocketBraille

SOURCE: Kentucky Department for the Blind
427 Versailler Road
Frankfort, KY 40601
(502) 564-4754

PRICE: $5.00 instruction manual

ANNOUNCEMENT *(Reprinted from Kentucky Department for the Blind)*

The Technical Services Unit of Kentucky's Department for the Blind is ready to release the construction manual for the Kentucky Porta-Braille and Kentucky PocketBraille.

The PortaBraille is an interactive braille computer terminal with a 20-cell refreshable braille display, braillewriter keyboard and up to 56K of memory.

Intended as a less expensive note taking and writing system, the PocketBraille can be used as a paperless braillewriter. Contents of its memory can be transmitted to a host computer and edited there. Plans are under development for equipping the PocketBraille with speech output.

The construction manual contains complete information for construction of either device, a full parts list as well as a list of sources for obtaining parts.

Anyone requesting a manual should accompany the request with a check or money order for $5.00. These should be payable to: Kentucky

State Treasury - Department for the Blind.

WHAT IS THE PORTABRAILLE?

The PortaBraille, a development of the Technical Services Unit, Kentucky Department for the Blind, measures about 8 by 6 inches by 2½ inches thick. It weighs 3 3/4 pounds and has a 20-cell braille display, made by Tiflotel Inc. of Bergamo, Italy.

When the front portion of the PortaBraille cover swings back, the braille display is revealed along with a seven key braillewriter keyboard. The PortaBraille is both an input and output device.

The PortaBraille has an RS-232 serial as well as parallel input/output capability. When connected to a computer, output from that computer can be read out in braille. When one 20-cell line has been read, the press of a key removes that set of characters and replaces it with the next line to be read.

The instrument also enables the user to read data set forth in columnar format. Using commands from its own keyboard, or escape commands from a host, left and right boundaries are established and each time the display is commanded to reveal the next set of 20 characters, this is done within the defined boundaries. This means that if it is important to read a set of tables, one can read down a vertical column. Where decimal values are involved, one should be able to read straight up and/or down with the decimal points properly lined up. Special commands allow uppercase as well as control characters to be displayed.

Connected to a telecommunications device for the deaf, the PortaBraille should enable a deaf-blind person to engage in telephone

communication with other users of such equipment.

With its braillewriter keyboard and up to 56K of memory, a user can use the instrument as a stand-alone writing device at meetings or other situations where quiet braille writing is preferred. Later, the machine can be connected to a computer, braille printer, inkprint printer, or other device for the transfer of information from the PortaBraille memory to computer disk or paper record.

The PortaBraille will serve as a portable, fully-interactive braille computer terminal permitting communication with a microcomputer or a mainframe. It is powered by A.C. house current or by its own rechargeable battery supply. Both power supplies are housed within the unit.

At our laboratory in Frankfort, Kentucky, we have built six units which are currently being tested for reliability. At this time we do not know the actual cost of producing a unit, but our goal is to make it as affordable as possible. We can say that the cost of parts for a single device is between $800 and $900, although this may vary depending on the amount of user memory desired.

We circulate documentation about the unit for those who might be able to build or have one built. Through the use of printed circuit boards, construction should be simple.

WHAT IS THE POCKETBRAILLE?

The PortaBraille has a little brother, the PocketBraille. The PocketBraille is a PortaBraille without the braille display and associated driving and power supply circuits. This makes the PocketBraille smaller, about 7½ by 4 by 1 inch thick. It is, therefore,

lighter, weighing only about a pound. Cost of parts is between $100 and $200, again depending on memory requirements. It is built into the plastic outer box used to contain a single VHS video cassette.

Powered by two 9-volt transistor radio batteries, the PocketBraille is intended as a data entry system. Information written into its 56K memory can be sent to a computer for editing, storage, printing, etc. It can be used to drive an inkprint printer, braille printer, speech synthesizer, modem, or even a PortaBraille. When used to drive a PortaBraille, a deaf-blind person reading the PortaBraille display could read at his or her own speed while the writer, using the PocketBraille, could write at an independent rate.

In a school setting where several students share one computer, the PocketBraille could serve as a data entry and temporary collection device to "feed" the computer.

Anyone interested in receiving announcements concerning the availability of documentation should contact us by mail or phone. This information will also be available through various newsletters.

VersaBraille II
Refreshable Braille Device

by Al Gayzagian

PRODUCT: VersaBraille II

SOURCE: Telesensory Systems Inc.
455 North Bernardo Avenue
Mountain View, CA 94043
(415) 960-0920

PRICE: $6,995 includes drives and cable

INTRODUCTION

This review is aimed at primarily two audiences: those who own the original VersaBraille and are considering an upgrade, and those who are contemplating the purchase of their first paperless braille device. We hope, of course, that those not fitting either description will benefit from reading this review as well.

SON OF VERSABRAILLE

The VersaBraille II is clearly a descendant of the VersaBraille; it uses many of the same commands and offers many of the same features. But, like most children, it also differs from its parent in several ways.

The most obvious difference is that VersaBraille II is a disk-based rather than cassette-based unit. In addition to its internal data storage capabilities, which we will discuss later, it uses three-and-a-half-inch disks as its main storage medium. To accommodate this feature, VersaBraille II comes with two disk drives, housed in a

separate unit which is connected to VersaBraille II. Both units plug into electrical outlets. As a result, the VersaBraille II cannot be used as a portable unit in conjunction with its disk storage medium.

Some other differences between parent and child are discussed below:

KEYBOARD

Like VersaBraille, VersaBraille II has a Perkins-style keyboard, but the keys are rubberized and operate with a rocking motion. It takes a little time to get used to this keyboard, but with a little practice it becomes easy to use. It is somewhat quieter than the VersaBraille keyboard, but the display—as the dots pop up—is a bit noisier.

In addition to the main keyboard, VersaBraille II has a cursor cross: four keys used to move the cursor and which surround a circular execute key. It also has a twelve-function keypad which doubles as a calculator keypad when the calculator program is run, on-off keys, and an advance pad which replaces VersaBraille's advance bar. The layout of the keyboard is reasonably comfortable, although I found the advance pad less convenient than VersaBraille's advance bar (purely a matter of opinion) and the upside-down calculator keypad, like the one on TSI's Speech Plus calculator, something of an inconvenience, differing as it does from nearly all other calculators.

On the back of the unit there are two serial ports: one primarily for use with a serial printer, and the other for use with computers and modems. There is also a port for a parallel printer—a most welcome addition—as well as connections for the disk drives and the charger/adapter, in addition to a safety switch to keep the unit from operating when being carried.

REPLACEABLE/RECHARGEABLE BATTERIES

Those who have sent their VersaBrailles back to TSI just to have the battery replaced will greatly appreciate the fact that VersaBraille II uses replaceable or rechargeable D batteries, which are under the complete control of the user. Another battery-related improvement is the longer period the unit can be operated using batteries—up to eight hours. Alas, you pay a price for this improvement; you can't use VersaBraille II on battery in conjunction with other equipment, neither its own disk drive, a computer, nor a telephone modem. When using VersaBraille II on battery, you are limited to reading and writing. However, within this context, it is convenient to count on a full work day's battery operation.

ENLARGED WORD PROCESSING CAPABILITIES

VersaBraille II offers some attractive word processing capabilities that go far beyond anything provided by its predecessor. These include facilities for defining, moving, and copying blocks of information; a search function within a complete file rather than a single 1000-character page; global or selective search and replace functions; and a much larger playing field within which to carry out word processing functions. By this, I am referring to the fact that VersaBraille II enables the user to work within a file of up to 25,000 characters, which is substantially more than the 1000-character page offered by VersaBraille. Those who have struggled to insert text into an almost-full VersaBraille page will appreciate this improvement.

MENUS

VersaBraille II leads the user through a series of menus to perform such tasks as creating, editing, reading, or deleting files; copying material to and from disk; sending material to a printer, and much more. These menus can be quite helpful to the novice user or can be circumvented by the experienced user.

GOOD AND BAD POINTS

After working with VersaBraille II for this review, I made a list of what I consider to be its good and bad points. The following are excerpts from that list with explanatory comments. I want to point out that different users and potential users will place varying degrees of importance on the good and bad features I have identified. People's needs differ.

I hope and believe, however, that all the factual information is correct. Certainly I don't want to mislead anyone by attributing to VersaBraille II any positive or negative features it doesn't deserve.

Good: *Searches entire file with good replacement function.*

The global replace function works well and is a welcome improvement. It is not, however, as versatile or sophisticated as Braille-Edit, a word processing program for the Apple.

Good: *Can write and insert within a wide space range.*

I mentioned this earlier, but I want to clarify one point. The VersaBraille II manual claims a RAM (random access memory) of 30,000 characters. In actuality, useable RAM is 24,576 characters or about 19% less. Nonetheless, the additional maneuverability afforded by this RAM for editing, not to mention the significantly larger work space available when editing a file, is very useful.

Good: *Fast access to data on disk.*

Disk files can be loaded for reading and editing very quickly. In most cases, access is much faster than for the VersaBraille, particularly if those files are located near the end of the tape.

Bad: *Limited capacity in portable mode.*

We come to the Achilles heel of VersaBraille II. Many of the items listed as "bad" are the result of VersaBraille II's limited RAM. Perhaps a comparison with VersaBraille will be helpful here.

I can take with me—using my VersaBraille in its portable mode—as many files as I need or files as large as I want. The cassette loaded in my machine can accomodate 400,000 characters, and I can carry with me as many similar cassettes as I want.

If I want to take VersaBraille II to a meeting, on the other hand, using its portable mode, I am limited to a file or combination of files not exceeding 24,576 characters—not much, considering the kinds of files many of us must work with. This is a serious limitation which will rear its ugly head at several points in this review. As we shall emphasize later, however, it is something TSI can correct.

Good: *Long battery use with recharge.*

We have already commented on the advantage of this feature and the price you pay to get it, but it represents a big step in the right direction. Anyone who has had a VersaBraille die in the middle of a meeting can attest to this fact.

Good: *Replaceable or rechargeable batteries.*

The batteries are easy to install and, as pointed out earlier, are under the complete control of the user. What a relief!

Bad: *Can't interface with other equipment during battery operation.*

This, of course, is the price you pay for longer battery life. There will be times when this limitation is a genuine nuisance, at least for some users.

Bad: *Interface process wipes out data in RAM.*

What this means is that before performing a second interface, you must either save your existing file to disk or lose what you have stored in RAM. Since you might be performing interfaces in the absence of your disk drive, you could experience some real problems. Availability of more RAM would eliminate or at least substantially reduce the need to destroy material stored in RAM before performing an interface and would allow most downloads to be completed without the need to interrupt the process to save to disk.

Bad: *Cumbersome save-to-disk procedure during downloads.*

The process of saving files being downloaded to disk is rather cumbersome. And, if you happen to be working with a system that doesn't observe either of the available handshake protocols—as is more often the case than we'd like—it's a virtual impossibility. Since the process of saving to disk must take place before you exceed the 24,576 RAM limit, this can present real problems when attempting to capture long files.

It should be said, however, that when downloading short files, VersaBraille II has a significant advantage over VersaBraille: there is no need to change pages after each 900 characters. This is useful when working with systems such as VersaBraille that do not observe handshake protocols and may lose some data under these conditions, unless operating at the slow 300 baud rate. Of course, the advantage that VersaBraille has is that you don't have to copy or destroy one file to download another.

Good: *Can move material from one file to another.*

The main purpose of this feature is to merge addresses with form letters or similar material. While the process is a bit awkward, it works and is a real time saver since it eliminates the need to type individual addresses or retype the form letter. There are other uses for this feature as well.

Bad: *Can't store customized parameter settings.*

This is an inconvenience only if you are working with outside systems having different parameter requirements. It is a relatively minor nuisance since the parameters can be reset quickly and easily. The need to note or

remember each combination of settings is the major inconvenience here, but not a serious one.

Bad: *Limited disk storage.*

Because each file is backed up by its ancestor, disk storage is limited to about 75,000 characters, although this can be expanded by wiping out the backup files. It is my understanding, however, that by the time this review hits the market, TSI will have the problem solved.

Good: *Formatting capabilities for constructing and reading tables and other columnar material.*

The combination of the supplied template, the formatting commands, and the jump command makes it relatively easy to construct and read tabular material, particularly solving the problem of using line-oriented devices like VersaBraille and VersaBraille II to access columnar material. I was easily able to set up a 4-column table and send it to my printer. Because the jump command isn't quite as accomodating as tab keys, this process isn't as convenient as it is on, say, Braille-Edit, but it is a very nice feature.

Bad: *VB emulator disables certain features, making it necessary to turn off and on while working.*

VersaBraille II has a feature called the VB emulator, used primarily when interfacing with other computers, as in the case of accessing an outside database with a modem. The need to turn this feature on and off is one of the tasks which makes the process of saving downloaded material to disk relatively cumbersome. Again, this should be considered a nuisance rather than a major drawback.

Bad: *Can't access disk files or a disk directory without destroying material stored in RAM.*

This points back to an earlier comment, but is somewhat different. It means that you can't check to see whether a file you have in RAM is also stored on disk without losing the RAM file. You have to copy anything you have in RAM to disk before using your disk files. Again, at the heart of this problem is the RAM limitation already referred to several times.

Good: *Convenient, useful function keys which carry out certain functions quickly and easily.*

Because some of the keyboard entry commands are awkward to carry out, it is nice to have function keys which perform these tasks without the need to be sure certain "chords" (keys struck simultaneously with the space bar) are executed properly.

Good & Bad: *The IBM and other interfaces aren't as easy to accomplish as they should be, but they can be done.*

An apparent bug in VersaBraille II treats the combination of 8 data length and 1 stop bit as if they were 7 and 2 respectively. Once you get over this hurdle, interfacing with an Apple or IBM PC can go quite well. I had an opportunity to try out some software, still under development, designed to let the user read an IBM screen on the VersaBraille II display. I met with only partial success, but the prognosis for getting it to work well is good; some people have had more luck with it than I did.

Some users may be interested to know that VersaBraille II can be used with Braille-Edit, except for the "from VersaBraille" and "to VersaBraille" functions. These can be emulated to some degree by treating VersaBraille II as a device inputing from a slot and as a printer. (Braille-Edit users will know what this means.)

Bad: *No carrying handle.*

VersaBraille II comes in a very nice soft pack which can be used as a back pack or in an over-the-shoulder mode. Unless you use the unit while it is in the softpak—something I found a bit awkward—you have to put it into the soft pack every time you want to take it from one room to another, even though you simply want to tuck it under your arm. It may be that the absence of a cover and the consequent possibility of damage from bumps kept TSI from installing a carrying handle, but it would be a real convenience.

Good: *Can search file directory by partial file names.*

The ability to group file names according to appropriate categories and to search the file directory with partial names, using the wild card options, is a very useful addition. It helps you to organize files better and to find files whose full names you may not remember.

Good: *Works with parallel and serial printers.*

The ability to use VersaBraille II with both parallel and serial printers substantially increases the unit's flexibility. Add to this the numerous formatting commands that can be entered from the keyboard, and you have a piece of equipment that gives the user a great deal of control over printer output.

Good: *Programs can be written to add to VersaBraille II's usefulness.*

As mentioned earlier, VersaBraille II comes with a calculator program on the supplied sample disk. TSI expects to be able to add a variety of other programs, such as a Grade II translator, which VersaBraille II users will be able to purchase. This potential for adding usable software could be very beneficial.

Good & Bad: *Good user's manual; no interface manual.*

VersaBraille II comes with one of the better computer manuals I have encountered. Despite a few editing oversights, it does an excellent job of taking the user through each operation step by step. On the other hand, VersaBraille II has been released without an interface manual--an oversight I hope will be corrected by the time you read this review. Chris Gray has produced a useful tape which covers many of the main points, but it isn't an adequate substitute for a real interface manual, especially in light of such problems as the parameter bug mentioned earlier.

WHERE DO WE GO FROM HERE?

I could continue to enumerate other minor good and bad features, but the important ones have been covered. It is, therefore, time to address the $64....well, rather $7,000 question:

Q: *Should VersaBraille owners somehow get rid of their machines and replace them with VersaBraille IIs?*

A: It depends. If you want more word processing capabilities, faster file access, longer battery usage, and some of the other good features we have identified, and if you don't need to use the unit in portable mode with files that exceed VersaBraille II's RAM capacity, the answer might be "yes." This assumes, of course, that you can come

up with the cash to make the switch. TSI has always maintained a trade-in policy and you should contact them to see how much more it would cost to trade your VersaBraille in for a VersaBraille II.

If, on the other hand, you already use Versatext's or Braille-Edit's word processing capabilities with your VersaBraille and aren't strongly attracted by some of VersaBraille II's advanced features, the answer is probably "no."

Q: *Should a person contemplating the purchase of a VersaBraille for the first time go for the VersaBraille II?*

A: The obvious answer would seem to be yes, particularly if TSI stops manufacturing and selling the VersaBraille. What may happen, however, is that current VersaBraille owners who answer "yes" to the first question may place their VersaBrailles on the market at attractive prices. The first-time buyer might find some good bargains which shouldn't be ignored.

Again, the decision should be influenced by the uses to which the paperless braille device will be put and, therefore, the degree of importance of the various good and bad features identified in this review.

CONCLUSION

My overall conclusion is that VersaBraille II offers some extremely attractive features accompanied by what some potential users will find to be rather serious flaws. The encouraging factor, however, is that virtually all these flaws can—and I am convinced will—be corrected simply by upgrading the unit's RAM capacity, hopefully to something close to 128,000 characters. This one improvement alone, accompanied by a few software changes eliminating the need to destroy files every time another device is accessed, would erase all the sections of this article dealing with bad features of any real importance. In fact, I understand that by the time this review appears, TSI already will have

begun by providing 32,000 characters of useable RAM.

With this extra RAM, we could all join Bob Hope in a round of "Thanks for the Memory."

The Microbrailler MB-2400 by Harvey Lauer

PRODUCT: Microbrailler

SOURCE: Triformation Systems Inc.
3102 S.E. Jay Street
Stuart, FL 33497
(305) 283-4817

PRICE: $5,750

(The following text was excerpted from an evaluation of the MB-2400 performed by Harvey Lauer, Thomas Kuyk, and Sue Melrose for the Veterans Administration. Although the review is a year old, it is still relevant today. The complete text is available from Harvey.)

THE MB-2400

The Microbrailler (MB-2400) is a portable braille word processor and computer terminal designed by Triformation Systems, Inc. of Stuart, Florida. It has a refreshable braille display, a braille keyboard, two serial interface ports, and a cassette drive. Information is entered into the MB-2400 via the braille keyboard and is displayed on the 24-cell paperless braille display. The built-in cassette tape drive allows the user to enter, review and/or edit text before storing or transmitting to another device.

As a computer terminal, the MB-2400 allows the user to connect it to a variety of computers for interactive use via the DTE port. The MB-2400 weighs about 8 pounds and measures about 12 inches by 12 inches by 3 inches. It operates on both A.C. and D.C. D.C. operations are via a built-in battery pack which, when fully charged, will power the unit for up to six hours.

The keyboard occupies the lower portion of the top surface and consists of thirteen keys: six braille keys, a space bar, four function keys, and two edit keys. Located just behind the keyboard is the braille display. It has 24 standard 6-dot refreshable braille cells.

THE PURPOSE OF THIS EVALUATION

The purpose of this evaluation was to determine whether the Microbrailler should be issued to veterans as an aid to reduce the handicap of blindness. The MB-2400 was evaluated because it represented a smaller, lighter, and cheaper device than the VersaBraille, which is its major direct competitor. In addition, it has several features that were considered advantageous compared to similar devices. It has two access ports where most other devices have only one; it has a larger main memory buffer, an auxiliary memory buffer for shifting text, and the ability to use the memory and display without running the tape drive.

TEST RESULTS

1) Keyboard and Display: The braille keys are small and widely spaced. They do not fit comfortably under the user's hands. The four function keys are indistinguishable by touch from the braille keys. They are arranged in a widely-spaced straight line and are not easily operated with one hand. This means there is a lot of unnecessary movement of hands off the braille keyboard and, if two hands are required, the user cannot monitor the display while operating the function keys. The display is unacceptable. Although it offers four more braille cells than most other devices, its poor construction results in very poor

quality braille dots. The height of the braille display pins is not uniform across and they are rounded and smooth, making reading very difficult. Two dots on one evaluator's display did not function and resulted in information retrieval errors. Because the display is located directly above the braille and function keys, the likelihood of accidental activation of these keys while reading the display is quite high.

2) Cassette Drive: Operation of the cassette drive can be very difficult and often requires two hands. The controls are embedded in the side of the case and are awkward to access. They are not labeled in braille and required excessive force to operate. The tape drive will accept 30, 60, and 90-minute tapes, and no formatting of the tapes is required. There are too many steps to remember to perform simple storage tasks, too many rules to follow, and too much room for error. For example, one must remember to reserve ten strings (2400 characters) for storage of the table of contents somewhere on the cassette or there will be no way of titling the data or noting its location. Once this has been done, it is up to the user to manually enter each new title, note its location, and update the index before entering new text.

3) Operating System: The operating system on the MB-2400 is cumbersome and complex. A good operating system does the following: it formats or initializes the storage medium, maintains a directory which it updates and from which it loads files, and it controls the storing device. The Microbrailler does not automatically do any of these; it only turns the power to its cassette drive on and off. The user must manually update the table of contents or directory, rerecord

it, and direct the machine to locate positions on the tape by number. These positions are frequently missed. To do all this, the user must use poorly-designed controls that require too much force.

Subsequent to this evaluation, a print page format routine was implemented which hopefully overcomes the major weakness in formatting text for printing. There was no automatic print format program on the devices evaluated. Therefore, unless text was sent to a computer or printer which can set its own line and form lengths, the control characters to do this had to be embedded in the text manually. However, the handling of control and upper case characters is poor. In the case of the control characters, only a few of them can be stored on tape. In addition, no control characters, not even carriage returns, can be displayed, so the user cannot read where lines change or whether the appropriate control character has been inserted. The only way to determine where the control characters are, in order to change them, is to print out the text, and even then, a blind user cannot see the printout.

The locating and storing of data is difficult and laborious. One must locate in the index memory the title of the text to be edited, enter the string number followed by a "P" (position), and either rewind or fast-forward the tape. When the display shows "play," the play button must be depressed. If the text location is within three strings, the MB-2400 will find it. Otherwise, rewind or fast-forward must be activated again.

4) Interfacing: The MB-2400 interfaces well with the Apple computer either through the Super Serial Card or the California Card.

Having two ports and five modes for operating them was found to be a positive feature. A user could have a computer connected through the DTE port and a printer connected to the DCE port and have five choices of operation. However, several interface or related problems exist. First, the user cannot read the display when data is being sent to the MB-2400; the MB-2400 display either shutters or remains dormant while data is being received. (This is possible with VersaBraille's terminal overlay or with the Talking Transcend program on the Apple computer.) Second, the accepted computer braille standard was not followed for ten ASCII characters. Furthermore, many of the control characters have one meaning to host computers and another to the MB-2400.

CONCLUSIONS

Overall, the human factors design of the system is quite poor. The operating system is cumbersome and complex, requiring almost total manual operation and memorization of numerous steps to do so, and the refreshable braille display is weak and unreliable.

The MB-2400 is not recommended for VA use.

Braille Display Processor or BDP by Dick Gage & Don Breda

PRODUCT: BDP-21, BDP-20

SOURCE: VTEK
1610 26th Street
Santa Monica, CA 90404
(800) 345-2256

PRICE: $3,495

WHAT'S SO DIFFERENT ABOUT THE BDP?

The first thing that comes to mind when you hear about a new braille output device is, "What makes this device different from the rest?" Both the VersaBraille and Microbrailler have been on the market long enough for most people to know what they do. (If not, you can refer to the chapter on refreshable braille devices in this book.)

But the BDP is different from other paperless braille devices in several important ways, which we will examine in this review.

WHAT IS THE BDP?

The BDP is a refreshable braille screen reader which comes in two models: the BDP-20 for the Apple II, IIe, and II+, and the BDP-21 for the IBM PC, PC/XT, or PC/AT. The refreshable braille display uses the conventional six-dot braille cell as well as an eight-dot braille cell. In fact, this is the only unit I know of that uses an eight-dot braille cell to find the cursor location. Two additional braille dots added to the base of a character mark the cursor location.

The unit is "software transparent" which means that you do not have to load any additional software to make the unit work — something Apple users should be happy to hear. You can access most ASCII text software without modification.

There are two components to the BDP: an interface board that plugs into your Apple or IBM, and the BDP display box itself. The display box has a 20-character refreshable braille display in the center of the front panel. Control keys are located on three sides of the braille display. To the left of the braille display are six text-locate keys which give the user screen review flexibility. Let's say you want to move the refreshable braille display to the last row, first column of a chart. This can be done quickly and automatically through the use of the text-locate keys. Above the display are two function keys and two cursor keys which bring the user to either the position of the application program's cursor, or the braille cursor where you were last reading on the refreshable braille display. And finally, to the right of the display are five logically arranged direction keys which are used to move the cursor.

There are also audio cues to tell you when you have reached the right or left margin, a blank line, or a blank page. The unit comes with a braille manual, and the company's advertisement that "it takes just minutes to master the keyboard" is, for most people, true.

THE UNIQUE FEATURES OF THE BDP

The single most important feature of the BDP is that it *preserves screen format*. It is this feature, as well as others, which distinguishes the BDP from the VersaBraille or Microbrailler.

Preserving screen format means that the user has knowledge of the cursor location at all times. It allows you to read the screen in a vertical or horizontal fashion; none of the other braille output devices can make that claim. The company literature states that the "BDP is the only system of its kind that maintains screen symmetry in columns and lines, perfect for reading spreadsheets and numerical data." This is not a boast without fact.

The many controls enable the user to quickly locate data at any point on the display screen. And the cursor control functions enable a user to quickly locate not only the braille cursor, but the application program's cursor as well.

WHAT THE BDP DOES NOT OFFER

It is as important to understand what features the BDP does not have in comparison to other paperless braille devices as it is to understand what unique features it does offer.

(1) First of all, the BDP is not a stand-alone device. Both the VersaBraille and the Microbrailler can be used as stand-alone devices for reading and writing. The BDP, on the other hand, cannot be used by itself; it must be connected to a computer or terminal.

(2) The BDP does not have storage capacity, which both of the other refreshable braille devices do. You can connect the BDP to a computer and use the computer's storage capacity, however. In fact, you would be at a severe disadvantage not to have a disk drive (or two) connected to the computer when using the BDP. The reason for this is

that when the screen is filling up with data, the BDP's display does not remain static. If you want to read a long file, it would be easier to read it with the aid of a word processor. If your computer does not support the paging of a file (that is, reading a screen at a time), then it becomes very difficult to use the BDP.

(3) The BDP does not work well interactively; the BDP is better when dealing with data after it has already been retrieved. This is why the storage problem, mentioned above, is so important. Although other refreshable braille devices also have a problem being used on-line, it is more difficult with the BDP.

SHOULD YOU BUY A BDP?

The golden rule before buying any computer device is to consider your particular application needs. Since the most important feature of the BDP is its ability to preserve screen format, the following applications take the best advantage of this device:

(1) If you are a programmer or someone who works with spread-sheets, the BDP may be the only device which offers you the kind of screen integrity you need;

(2) If you do a lot of transcription and word processing tasks, the BDP in conjunction with an Apple or IBM is a fantastic device to work with. By taking advantage of the word processing program on your computer and the BDP, you can easily move text around and know where the cursor is at all times. The BDP is also very handy for fixing up a file that you have retrieved from a database. Using this device, you will know exactly how your document looks on the screen.

WHEN THE BDP IS NOT THE BEST BUY

The following applications may preclude the purchase of a BDP:

(1) If you spend the majority of your time retrieving information from a database, the BDP may prove cumbersome. This is true of any dynamic braille device to some degree, but more so with the BDP because you must wait until the screen is static before you can begin to read. There is no terminal overlay, such as with the VersaBraille, to allow you to read while data is still coming in. Because of this, and because you must take your hands off the keyboard to use the BDP, I do not recommend it for lengthy telecommunications or tasks of an interactive nature;

(2) If you need a portable, stand-alone device for creating documents and saving data, then the BDP is not a good choice. The BDP does not have a keyboard, nor can you enter text through the control pad;

(3) If you must read lengthy text files quickly, a speech output device might be preferable — particularly if you're not a good braille reader.

FINAL COMMENTS

It's not really fair to compare the BDP with other refreshable braille devices on the market because it is so different in nature. It is safe to say, however, that when it comes to screen-oriented work, such as word processing, spreadsheets, or programming, the BDP is perhaps the best — if not only — device to buy. But if you need a portable note-taker or a storage device with telecommunications capabilities, the BDP is not for you.

CHAPTER 7

Odds and Ends

This chapter contains all those products which did not neatly fit into the predefined categories of scanners, modems, braille printers, print printers, speech synthesizers, or braille output devices. This does not make them any less useful; in fact, they may offer the right user just what he or she needs.

Small Talk
A Portable Talking Computer by Frederick W. Noesner

PRODUCT: Small Talk

SOURCE: VTEK (distributor)
1625 Olympic Blvd.
Santa Monica, CA 90404
(213) 452-5966

PRICE: $2195

THE WORLD'S SMALLEST, NEWEST TALKING COMPUTER

Have you ever wished that you had a truly portable, efficient way to write letters, memos, articles, or just take notes? Do you feel overwhelmed by the rapidly changing world of computers? Are you looking for a really simple, practical, easy-to-learn talking notebook? Then Small Talk may be just what you're looking for.

Small Talk weighs 5 pounds and measures 14 inches wide by 9 inches long by 1 3/4 inches thick. The entire unit is not much larger than a standard notebook, and comes with an attractive vinyl carrying case. The following hardware and software features come with Small Talk—without having to make any additional purchases:

- A standard typewriter keyboard, which speaks each key as it is struck;
- A rechargeable battery that gives hours of use;
- A built-in voice synthesizer with adjustable voice pitch and rate for the screen or keyboard;
- A built-in micro printer which is very handy for messages, notes, tests, etc.;

- A built-in microcassette for storage of information;
- A built-in visual display;
- Two DIN-type serial ports which allow for cabling to full-size printers or to other computers, such as the IBM PC or Apple IIe;
- A talking word processing program called Word Talk;
- A talking scientific calculator program called Calc-Talk;
- A clock and a calendar.

Both Word Talk and Calc-Talk programs are located on built-in chips and require no separate, externally-loaded software.

Small Talk comes with a compact smart charger which prevents over-charging, and both print and cassette manuals. The only addition you will need is a printer (your choice of serial printers), and a printer cable, which runs around $44.50.

A COMPLETE SYSTEM

Small Talk is a complete system that can go anywhere and do almost anything you need in the way of writing for less than $3,000 (including printer).

Small Talk is incredibly easy to use. With a flick of the ON switch, you are greeted with the welcome message that tells you everything is working and you are ready to proceed. You then have a choice of pressing either a "C" to use the calculator, or "W" for word processing. Press the return key, and you are ready to start typing your first document. It's that simple.

If you have to stop, you simply turn the machine off without losing your work. When you turn it back on again, press "W" and RETURN and you're right back where you left off. It takes only a few key strokes to permanently save your work on cassette when you're finished. Then you can clear your immediate memory and start a new document.

All corrections can be made from the keyboard; you don't need to exit the program or utilize menus. You can insert, delete, rewrite, review—anything you wish to do to your document.

There are four major keys on Small Talk: RETURN, CONTROL, COMMAND, and ESCAPE. The Control key is located just to the left of the "A" key on the home row. Most letters of the alphabet have a control value. For example, if you hold down the Control key and strike the letter "C", your document will be cut apart. Anything you type next will be inserted without writing over the existing text. When you are ready to paste it all back together, hold down the Control and press "P" and your work is pasted together. If you wish to backspace over a letter that you may have misstruck, you simply hold down the Control key and strike the letter "H."

The Command key is located to the left of the space bar. This key enhances the Control key. Therefore, if you want to backspace over an entire word, you hold down both Command and Control and then strike the letter "H", and Small Talk will back up over the entire word. Your cursor will be left over the first letter of that word. If you wish to space forward, you hold down Control and strike the letter "U" and it will announce what you have written letter by letter. This is

very handy for checking your spelling. If you prefer a word-by-word review, rather than letter-by-letter, you hold down Command and Control and strike the letter "U."

Small Talk will announce the time and date when you press the left-most function key. You don't have to leave your work to do this since this computer has a built-in clock and calendar. This is particularly helpful if you have started a letter and don't remember the date.

With a cassette-based portable computer like Small Talk, the logical question is, "How much can you type in immediate memory before you must save your work?" The answer is it depends on the format you select. For a normal-sized page of single-spaced text, you can write about six pages. Double-spaced material extends to twelve pages. You can save three of these units of text on each side of a micro cassette. So, you can store about 36 pages of single-spaced material on each side. There is, of course, no limit to the number of cassettes you can use. But then, again, you wouldn't want to do a rewrite of Gone With the Wind.

If you have access to a larger office system, you can easily load back and forth. This means that you can dump material from your office system to Small Talk and take it home over the weekend. A portable unit, you can even use it on a bus, boat, or plane. And when you return to the office, you can load the new material up to your office system.

The Escape key allows you to move back and forth from tape to printer, and back to text. If you are cabling to a different printer, or to another computer, you can easily set any of the parameters such as baud rate, parity, etc. from the special keys just above the number row.

Small Talk sounds too good to be true, but it is. You can't compare it with an IBM PC because it wasn't meant to compete in that class. But if you're looking for a small portable system to write on, it is an excellent choice. In my position as Director of the Sensory Aids Department at Associated Services for the Blind, I have had the opportunity to try many devices for the blind. I have only retained two of them: an Optacon and a Small Talk. I believe these two devices are the most significant to be developed for the blind in the past 15 years.

I used Small Talk to write this article (Editor's Note: the manuscript arrived in perfect shape). Earlier this summer, I used Small Talk to print recipes and track sales at a national convention. I am certain that this wonderful portable device will have a great impact on the lives of blind students, businesspeople, writers, and a host of others. Hats off to Computer Aids for a job well done.

A Closet Full of Cables

by B.T. Kimbrough

Reprinted from "Off the Shelf," Dialogue Magazine, Summer 1985.
Copyright 1985 Dialogue Publications. All rights reserved.

I guess it was bound to happen sooner or later. I could not hope to keep this column out of the clutches of computerdom indefinitely. The irony is that I unwittingly opened the door myself six months ago by devoting this space to a heartfelt chorus or two of the "Audio Adapter Plug Blues." Now, of course, I am compelled by what admittedly may be an overdeveloped sense of fairness to translate that plaintive melody into computerese. That winter column contended that nobody who needs to move freely about the world of separate but interacting audio components can long endure without a pocket or a purse full of adapter plugs. At the last minute, I decided not to close the piece by saying that active computerniks face the same problem; it's just that they need bigger pockets. Now, after some hard thinking about the micro-junction jungle, I'm glad I saved that line.

Connecting cables for computers usually cost at least $25. Otherwise, they have little in common with each other, or other creatures in the cosmos, for that matter. While most audio cables terminate in male plugs on both ends, computer cables often bring together plugs of opposite genders, along with occasional male-to-male and female-to-female matchups. The connectors on the computers are either male or female, and either serial or parallel. Serial connecters come in two basic types--DTE for Data Terminal Equipment and DCE for Data Communications Equipment. Parallels come in a distressing variety of shapes

and sizes, but more of that in a bit.

The real irritant in all of this is that there are no computer adapter plugs. The economic consequences of that simple fact are difficult to exaggerate. If you have a cable which ends in the wrong plug, you can't simply stick on the end you need and get to work as you can in the world of audio. You have to go and buy a whole new cable with new plugs permanently and expensively attached. I can hear some of you wondering craftily whether if wouldn't pay you to provide adapters for a computer-hungry world and fill your pockets with something besides miniplugs. First, be sure you understand the ABC's of computer connecting. That may be enough to convince you to trade all your slick computer catalogs for a reconditioned abacus.

When two computers talk to each other, they must be joined by up to 25 separate wires. This accounts for the thickness of the cables involved. Since computers can transmit to each other and receive from each other at the same time, it is essential that all of the output lines of one machine be tied to the input lines of the other, and vice versa. If the connections are improperly made, you wind up with your wires crossed, and no information will change hands.

Some microcomputer manufacturers take all of the options out of the user's hands at this point by assigning data exchange to what is called a parallel interface. Lots of low-priced micros have parallel connectors for the attachment of printers, and they are wonderfully simple to use when they work. Parallel connections are established by customized cables which are provided with just the right wires for your computer on one end and just the right bunch for your printer on the

other. If you like the printer for which the cable is matched, and if you keep your computer forever, you will love parallel interfacing. However, if you decide to trade printers with someone, you may find that neither your trading partner's parallel cable nor your own will connect your old computer and your new printer successfully. In other words, parallel is simple, and therefore, not very flexible. Parallel connections are basically restricted to printers. They cannot be used to attach your printer to a telephone modem or to another computer. For that, you need something called an RS-232 serial connector.

In theory, you can buy one standard RS-232 cable and use it to connect any two computer-related devices which have the supposedly standardized interface. Don't you believe it! I have been working directly with computer devices for about 18 months, and already, I have more special cables than a diplomat on a sensitive mission. In fairness, I have to say that I think some of the computer companies have tried to keep things as simple as possible. But not everyone has cooperated, and the task of putting these complicated gadgets in touch with each other is a lot tougher than the one faced by the audio companies who gave us the original adapter plug jungle.

As I mentioned earlier, the RS-232 standard recognizes two kinds of interface connecters--DTE and DCE. Typically, a DCE which terminates in a female connecter transmits data from computer to printer. Usually, the DTE is a male connecter which receives your text as it arrives inside your printer. Unfortunately, some printer companies put female connecters on their hardware, requiring the use of a cable with two male connecters instead of the standard male/female configuration.

Moreover, some computer designers assume that any printer you may wish to use will be connected through the parallel port. Then, they configure the only serial port on their machine as a DTE modem connecter with male hardware. This little snafu leaves you with no choice but to purchase what is called a terminal-to-terminal or null modem cable. This is the only kind of cable which will allow the DTE port on your computer to talk successfully to the DTE port on your printer. In fact, if both the DTE ports you have interfaced have male connecters as they are supposed to, you will have to buy a null modem cable with a female connecter on each end.

Then there is the small matter of modification. All of the major computer companies agreed at one time what signal should go through each wire housed in the standard DTE and DCE ports. Lately though, some of the designers have changed the standard configuration around in order to gain some small marketing advantage in their extremely competitive business. Obviously, the off-the-shelf cables have to be modified when connected to nonstandard devices. Actually, you don't have to do anything to the cables themselves; you have to open up the covers on one or both of their connecters and manipulate the tiny pins inside. If you don't want to do that, you can spend $50 or so to buy a modified cable. As you can see, if you are unlucky and you have several combinations of devices to interface, you could wind up owning half a dozen cables.

At least one small company has tried to address this absurd problem by developing a so-called "smart cable." The link costs about $100,

and is supposed to adapt itself to the signal requirements of each separate interface connection. However, I don't think it can change itself into a male-to-male or a female-to-female cable in response to the hardware glitches I described earlier.

I concluded my lighthearted discussion of audio adapters by wishing that my friendly Amway representative stocked a generous supply of minis, quarter-inchers and stereo-to-mono jacks. When it comes to this cockamamy chaos of computer cables and connecters, I have a better idea. I'm going into that business myself. I have enough plugs and cables on hand already to fill more orders than you would believe. And just to show you that my software is in the right place, I'm going to let you in on the ground floor. Fast cable franchises, anyone?

Braille-n-Print by Gary Anderson

PRODUCT: Braille-n-Print

SOURCE: Computer Aids Corp. (distributor)
124 W. Washington, Lower Arcade
Fort Wayne, IN 46802
(800) 647-8255

PRICE: $1,290 (includes printer)
$ 895 (without printer)

COMPATIBLE: Perkins Brailler

How many times have you produced a document in braille on your Perkins Brailler and wished you could have the same material in print without having to double your effort? Well, for me, the answer is often. And that's why the Braille-n-Print system has become a very handy tool for me at work.

The product was designed by Quantum Engineering Design of Australia and is being distributed in this country by Computer Aids Corporation. The system is a braille to text back-translator that takes advantage of your Perkins Brailler. You first produce a document in braille using your Perkins keyboard and — with the addition of the Braille-n-Print device — you can simultaneously produce the same material in print on a printer.

USING BRAILLE-n-PRINT

Braille-n-Print is actually a new base which fits comfortably underneath the bottom of your Perkins Brailler after you have removed

the old cardboard bottom. The microcomputer in the Braille-n-Print reads and stores the braille keystrokes and translates them into print; as soon as you complete a line of braille text on the braillewriter, it will automatically be translated and printed on the printer. If you already own a compatible printer, then you can purchase the system for less and use your own.

Braille-n-Print is extremely easy to learn and use. There are only two switches which are conveniently located and impossible to confuse. On the right front edge of the unit is the DATA SWITCH. When the DATA SWITCH is "up," you can enter material into the brailler without it being translated into print. When the DATA SWITCH is "down," the information you have brailled will be translated into print and printed on the printer.

The second switch, the RESET button, is located at the right rear edge of the unit. When this button is activated, all previous settings are cancelled, and it also aligns the print head to the left margin. When pressed, this button gives off a distinctive "beep," and you can also hear the print head move to the margin.

All special commands are issued through the braille keyboard and are explained in detail in the accompanying manual (in braille or on cassette). The manual takes you through the entire process easily and efficiently.

SHOULD YOU BUY A BRAILLE-n-PRINT?

Braille-n-Print was originally designed for use in school settings where blind students could simultaneously produce materials in braille

for themselves and in print for the teacher. But this device is also gaining popularity in personal and business applications. I have been using Braille-n-Print for six months in a work setting, and find it to be a great correspondence tool in communicating with my sighted coworkers.

However, the Braille-n-Print does not offer word processing; you can only store one line of braille characters before you must print it out on a printer. If you make a mistake on the braillewriter, you can backspace, rekey the correct braille character, and the resulting print copy will be correct. Later, you can clean up the braille copy if you wish. Braille-n-Print is perhaps best suited for a person who is most comfortable writing on a braille keyboard, who needs to correspond in print and braille simultaneously, and who cannot afford a braille embosser and computer system.

Lock-Lite
Keyboard Indicator for the IBM PC by Duane R. Christianson

PRODUCT: Lock-Lite

SOURCE: Lambert Logical Design
513 Wilshire Blvd., #228E
Santa Monica, CA 90401
(213) 395-2420

PRICE: $43.95 includes shipping & print manual
$5.00 for manual on cassette

COMPATIBLE: IBM PC, PC/XT, or Compaq Desktop only.

WHAT IS LOCK-LITE?

Those of you who own an IBM PC are familiar with the unconventional layout of its keyboard. On the right-hand side of the regular keyboard is a keypad which serves two functions. In one mode, it operates just like a numeric keypad; in another mode, it serves several word processing functions like cursor movement and control. For example, when the NUM LOCK (meaning number lock) key is depressed, the number keys—positioned as they are on a calculator—are used for making calculations or for entering numbers. When the NUM LOCK key is not activated, these number keys become cursor control keys. The "4" key, instead of activating the number 4, now moves the cursor to the left; the "2" key moves the cursor down, etc. Several other keys are located near this keypad as the CAPS LOCK key, which produces caps when depressed.

The problem with this layout for a blind operator is the potential for making disastrous mistakes by unwittingly activating the wrong key.

Before purchasing the Lock-Lite, I often produced a string of 8s while trying to move the cursor up, or I produced all caps by accidentally hitting the CAPS LOCK key.

Lock-Lite has kept me from making many such maddening errors. The Lock-Lite indicates the status of keys through both light and sound; for the blind operator, the sound indicators can be very helpful.

HOW DOES LOCK-LITE WORK?

Lock-Lite is small, measuring about 2 inches wide by 1½ inches long by 1 inch high. It requires no additional power and comes with two connector cables which provide a welcome 3 feet of extra working distance. Two velcro strips may be used to attach it to the computer or even to the monitor.

Installation is simple and can be done without reading the manual that comes with it. The manual is straightforward, clearly written, and doesn't demand translation. Phone help? Excellent, well-informed, and refreshingly genial. Don't be surprised if you reach the company's president.

For sighted users, Lock-Lite has three small light indicators: red to indicate CAPS LOCK, green to indicate NUM LOCK, and amber to indicate the programmed key. Obviously, these lights are irrelevant for a blind user.

But Lock-Lite also provides sound cues. When toggled on, CAPS LOCK, NUM LOCK, and the programmed key produce an ascending fourth (musical jargon meaning the pitch goes up a fourth interval). When toggled off, the fourth descends. The Control (CRTL) and the Alternate

(ALT) keys produce a descending third. Right Bracket (]), Backslash (/), Tilde (~), Print Screen (PRT SC), and SCROLL LOCK produce an ascending third.

Volume is pre-set at the factory to be quieter than the PC's own sounds and is intended for an office environment. The manufacturer is considering producing a volume control, but development would be extensive and, therefore, expensive. Until a volume control appears, blind users may wish to identify themselves as visually impaired and you will get the loudest units—if you want them. I have used Lock-Lite for over two weeks with and without earphones and a speech synthesizer. If no one is using the lighted display, try attaching Lock-Lite to the front rather than the side of the PC; when facing forward, the speaker volume increases about 20%. Computer trainers may want to put an amplifier on Lock-Lite temporarily, or perhaps permanently if a noisy printer is housed nearby.

I have used Lock-Lite with several different software programs on my IBM PC with no apparent effect on the device. The manufacturer notes that some programs may reverse the keyboard condition, such as putting one in CAPS LOCK mode without the Lock-Lite being aware of this change. Some possible remedies are: 1) be aware of what software changes key states when loading it; 2) reset the computer and Lock-Lite to default mode by the usual key combination: CTRL - ALT - DELETE.

You can also program a key to beep. To do this, you hold down the CTRL key, then SHIFT and ALT plus the Backspace key. Release keys. The next key struck will now beep with the same sound as a CAPS LOCK or NUM LOCK key. A programmed key is not permanently programmed, but

the process is so easy, that this is really not a problem. The user can also control what "beeps" by hitting CTRL - ALT - SHIFT and using the function keys, *i.e.*, F1 will cause all keys to beep; F4 will cause the Print Screen and Scroll Lock keys to beep, etc.

FINAL COMMENTS

Lock-Lite is an excellent device for use in training as well as for job modification. I would like to program more than one key to beep, guarantee that a programmed INSERT key would sound radically different from its neighboring CAPS LOCK key, and not hear non-toggling programmed keys sound like toggling keys. Aside from speculating on what the ideal beeping keyboard should be, I am delighted with this product.

MCI MAIL: MAKING SURE IT GETS THERE

by Barry Scheur

It was after midnight, and I was exhausted. I returned to my hotel room after a long day of consulting, eager to turn in and get some much needed sleep. I called the front desk to inquire about messages.

"Yes, Mr. Scheur. You received a rather desperate call from a woman who says she's putting together a book and hasn't received your article. She said they start recording tomorrow, and she must have it in time." How she tracked me down in Tyler, Texas, I'll never know; that woman is relentless.

Enter technology to the rescue. Fortunately, I had the article on a VersaBraille cassette in my briefcase. I was able to transmit the article from my VersaBraille, over the phone, to MCI Mail; it arrived at the National Braille Press when the doors opened the next morning. And, I got a good night's sleep.

MCI Mail, Easy-Link, and other "electronic" mail services allow you to send a letter, report, or almost anything else you want to write, via your computer, either for retrieval by another computer or—and here's the beauty of it—for production and delivery in hard copy.

While the speed and flexibility of this service are its main features, I am convinced that the greatest value of the service to visually impaired persons may be in doing away with printers. There is nothing worse than to print out a document—a time-consuming chore if you have a slow printer—and then to discover that your ribbon ran out or got out of alighment, or that your paper stack had emptied

halfway through the report. With MCI Mail, you have the security of knowing that the document is presentable, properly formatted, and that it reached its destination on time. It takes a 20-cps letter-quality printer approximately 20 minutes to print a 10-page, single-spaced document; using MCI Mail and a 1200-baud modem, it takes just 6 minutes.

HOW DOES MCI WORK?

You can connect to MCI Mail for a one-time, "sign-up" charge of $18 (which is also the yearly fee) where you register your "user name." That means that you are assigned an ID (which usually corresponds to a shortened form of your name). You use this ID to log-on. If you want to register your signature and letterhead, the charge is an additional $20 a year.

After the initial sign-up charge, you pay only for the documents you transmit. MCI has four levels of delivery: (1) "electronic" to someone else's computer through their MCI Mail box or through logging-on and taking down the information from yours; (2) regular 2-3 day hard copy delivery ($2 for up to 3 pages); (3) overnight hard copy sent before 10 p.m., delivered before noon the next day ($8 for up to 6 pages); (4) "courier" hard copy, 4-8 hour delivery to selected zip codes anywhere in the U.S. ($30 for up to 6 pages).

You can prepare your letter in advance, or type it while you're on-line. The only problem with typing it while on-line would be if you don't have a line editor as part of your software and, therefore, cannot put in the appropriate carriage returns at the end of each line.

To prepare a letter, you select the option "create" from the menu. You are then prompted for the name and address of the recipient, along with similar information for any other people you want to receive copies. When you've finished, you send a "slash" on a line by itself. The message is then placed in your "outbox" and is ready for sending. You have a number of choices: to edit the letter, format it for printing, cancel it, or send it in one of the formats discussed above. That choice is also made from a menu and, voilà, the document is on its way.

If you run into any trouble, the MCI Mail Customer Service people are extremely helpful. As with most business creatures, they can only be reached between 9 a.m. and 6 p.m., EST.

By the way, the recipient will never know that your letter has been sent via "computer." It comes in an envelope and is produced with a high-quality printer. While MCI Mail has not yet replaced the U.S. Postal Service, for me it's getting close.

For more information on MCI Mail, contact them at their toll-free number: 800-424-6677.

MORSE ENHANCEMENT PROGRAM

by Gayle Sabonaitis

The Morse Enhancement Program is software that runs on any IBM microcomputer and enables a deaf-blind person to review the contents of the screen. Tests performed on both the IBM PC and IBM PCjr produced slightly different results on each. Since this software requires that the program be on the booting disk, speeds of transmission of the Morse code will vary depending on the computer. If the software is customized for the specific model, this problem can be eliminated.

For a deaf-blind person, instead of using a speech synthesizer, a Realistic SA-10 audio amplifier is used. By holding the audio speaker in the hand or tucked under the chin, a user can feel the Morse code, and have access to all the information on the disk. One difficulty is that the person cannot type and hold the speaker at the same time. Therefore, it is likely that typing errors will not be caught until the text is reviewed.

Other features of the program are more subtle. For example, one can only read in review mode. This limits the interaction the user has with the system. It is possible to turn off the sound of the space-bar. "Hearing" the spacebar can be confusing when reading lengthy items. The user can select a particular line of the screen to be read, but the screen must first be frozen. To edit, the screen must be released. This procedure, similar to that of most speech screen readers, is awk-ward but can be a good learning format.

A nice feature of the program is that a person who does not know Morse code, but who can type, can communicate with a deaf-blind person using this software. The deaf-blind person receives the text being typed by the other person, and the speed of transmission can be varied. For the person who is typing, it can be a frustrating process. The typing pace must be fairly slow because the program has a very small buffer. The buffer will clear automatically, but it's slow. The typist has to wait a second every sixteen characters. And, the buffer has a limit; after about 400 characters, the Enter key must be struck or the program will no longer accept input. Although these problems are inconvenient for the typist, it does mean you can converse directly with a deaf-blind person, as opposed to third-party interpreting.

This program gives the deaf-blind person, who is familiar with Morse code, a means of exploring the world of computers. Although it should not be the sole means of computer access for the deaf-blind, it is a start.

For more information, contact me in braille only.

The Perfect VersaBraille Case

A good, sturdy VersaBraille case is available from a large retail and mail order dealer, Forty-Seventh Street Photo. They sell a "Coastal Shock Absorb-A-Bag" for $49.95 which has the following features: (1) a full-width VersaBraille compartment; (2) a second full-width compartment that can handle a small briefcase, portable printer, folders, or a notebook of cassettes; (3) two half-width compartments that are perfect for a VB charger or a modem; (4) a compartment on either end which will handle cassettes, a small "Walk-Man" unit, or whatever miscellaneous item you want to carry. The case is well-padded, and comes with a comfortable handle.

Talking Tablet System

Noel Runyan, a well-respected engineer in the field, is working on a speech output, personal information center, which functions as a word processor, note-taker, forms-writer, computer terminal, and as a computer display. It uses high-quality, built-in speech, a keyboard that can be used in regular typing or in braille mode, a touch-sensitive tablet, and special review controls for true random-access, full-page review.

It can be used as a stand-alone, or as an output device hooked to a personal computer. It is battery-powered and portable. Scheduled for release in the spring, it should cost about the same as an IBM PC and offers speech comparable to the DECtalk. For further details, contact Noel.

CHAPTER 8

A Comprehensive Listing (but not all-inclusive)

A COMPREHENSIVE (BUT NOT ALL-INCLUSIVE) LISTING

If you read our last computer book, you know the dilemma we faced when we attempted to list all of the books and manuals on computers that have been brailled or recorded in this country. Things were progressing nicely until Recording for the Blind sent us over 1,000 titles! By now, the number must be even greater.

Again, this year, the list is not all-inclusive for the same reasons. At first we thought we would run only those titles pertaining to peripherals. But then we saw such wonderful titles as the IBM PC Disk Operating System manual brailled by National Braille Association, and the Lotus 1-2-3 manual recorded by FlipTrack Learning Systems, and couldn't resist running the full list.

Therefore, a complete listing of titles is available from all agencies except the National Library Service for the Blind and Physically Handicapped and Recording for the Blind. These two agencies are working cooperatively to put their collective listings on a joint database, so eventually a consumer need only call one number to inquire about a title.

ASSOCIATED SERVICES FOR THE BLIND
919 Walnut Street
Philadelphia, PA 19107

PERSONAL COMPUTER MANUALS

APPLE BASIC AND MICROCOMPUTER SYSTEMS by J. Poirot. 3 vol., 255 pp., $58.50.

APPLE IIe 80 COLUMN TEXT CARD MANUAL. 1 vol., 108 pp., $24.10.

APPLE IIe OWNER'S MANUAL. 1 vol., 82 pp., $18.90.

APPLE IIe REFERENCE MANUAL. 1 vol., 133 pp., $29.10.

APPLE IIe REFERENCE MANUAL (for Apple IIe only). 5 vol., 460 pp., $104.50.

IBM BASIC PERSONAL COMPUTER HARDWARE REFERENCE LIBRARY. 5 vol., 538 pp., $120.10.

IBM PERSONAL COMPUTER TECHNICAL REFERENCE. 8 vol., 873 pp., $194.60.

THE KAYPRO USER'S GUIDE. 2 vol., 147 pp., $34.40.

KAYPRO MICROSOFT BASIC 80 USER'S GUIDE. 4 vol., 352 pp., $80.40.

USER'S REFERENCE GUIDE FOR TI. 6 vol., 560 pp., $127.00.

EXTENDED BASIC FOR TI HOME COMPUTER 99/4A. 4 vol., 432 pp., $96.40.

TI 99/4A BEGINNER'S BASIC. 3 vol., 311 pp., $69.70.

TI EXTENDED BASIC. 1 vol., 77 pp., $17.90.

TI TERMINAL EMULATOR II. 1 vol., 96 pp., $21.70.

TI SOLID STATE SPEECH SYNTHESIZER. 1 vol., 18 pp., $6.10.

APPLICATIONS PROGRAMMING (IBM Data Processing Training Unit). 2 vol., 216 pp., $48.20.

A GUIDE TO PROGRAMMING IN BASIC PLUS by Presley. 4 vol., 426 pp., $95.20.

MAGAZINES

DATAMATION-PLUS. Monthly on cassette. Subscription: $33.25/year; $16.00/year if cassettes are returned.

Selections from Datamation, Computer World, and others.

BRAILLE INC.
157 Locust Street
Falmouth, MA 02540

IBM 3101 DISPLAY TERMINAL DESCRIPTION by IBM. 4 vol., 400 pp., $160.

PDP-11 PROGRAMMING CARD by Digital Equipment. 1 vol., 70 pp., $36.

Braille Inc. will transcribe any computer manuals for a fee. They offer a quick turn-around braille transcription service.

BRAILLE INSTITUTE
741 North Vermont Avenue
Los Angeles, CA 90029-3594

PRICES: $.09 per braille page plus $.75 per volume for binding.
Sales tax to be added in California.

APPLE II DOS PROGRAMMER'S MANUAL. 6 vol., 520 pp.

APPLE DOS USER'S MANUAL. 4 vol., 338 pp.

APPLE WORKS QUICK REFERENCE CHART. 1 vol., 23 pp.

AUTOMATED PROGRAMS FORMAT GUIDE FOR TWA. 3 vol., 246 pp.

BEGINNER'S GUIDE TO HOME COMPUTERS by Marvin Grosswirth.
Doubleday & Company, 1978. 6 vol., 356 pp.

BRAILLE 'N PRINT. Update, 1984. 1 vol., 17 pp.

BRAILLE 'N PRINT MADE EASY, 1984. 1 vol., 23 pp.

COMPANION COMPUTER, 1983. 1 vol., 109 pp.

COMPUTER GRAPHICS, INDICATORS AND SYMBOLS (Braille Computer Code),
1 vol., 14 pp.

COMPUSERVE INFORMATION SERVICE USER'S GUIDE by Radio Shack.
1 vol., 73 pp.

dBASE II ASSEMBLY-LANGUAGE RELATIONAL DATABASE MANAGEMENT SYSTEMS
by Ashton-Tate, 1981. 12 vol., 654 pp.

ECHO II SPEECH SYNTHESIZER INSTALLATION AND OPERATING INSTRUCTIONS
by Street Electronics Corp., 1982. 1 vol., 84 pp.

IBM SYSTEM REFERENCE LIBRARY - COBOL (ANSI), 1973. 17 vol., 1340 pp.

MCS6500 MICROCOMPUTER PROGRAMMING MANUAL by MCS Technology, 1975. 9 vol., 619 pp.

MINDWARE MW-100 PRINTER MANUAL, 1 vol., 26 pp.

NBI SYSTEM 3000 KEYBOARD DIAGRAM. 1 vol., 21 pp.

SHARP INTELLIWRITER PA-1000. 2 vol., 117 pp.

STYLUS TRAINING MANUAL by Estelle Doheny Eye Foundation, 1980. 2 vol., 114 pp.

STYLUS USER'S MANUAL by North-West Computer, 1979. 2 vol., 124 pp.

VOLKSMODEM 12 OWNER'S MANUAL. 1 vol., 80 pp.

VOTRAX PERSONAL SPEECH SYSTEM - OPERATOR'S MANUAL, 1982. 2 vol., 169 pp.

VT 100 USER'S REFERENCE GUIDE. 1 vol., 64 pp.

WHATSIT (Selected Sections), Computer Hardware, 1979. 2 vol., 134 pp.

FLIPTRACK LEARNING SYSTEMS
999 Main, Suite 200
Glen Ellyn, IL 60137

Blind and disabled computer users have discovered step-by-step audio cassette training courses for developing personal computer skills. Published by FlipTrack Learning Systems, the interactive courses teach first-time users a wide range of personal computer hardware and software skills. The courses operate on any standard cassette player, with no computer hook-up required. Software courses teach skills for any computer that runs the software.

Originally developed for sighted and able-bodied persons, the audio format and "human" FlipTrack style make the courses well suited for individuals with visual, physical, and learning disabilities. Most obviously, the "teacher-on-a-tape" verbally leads the blind computer user into a comfortable familiarity with the computer. The courses are not manuals read onto cassettes, but rather lively, conversational courses that are encouraging and never patronizing.

For persons with learning disabilities, the cassette player can be stopped and started at any point in the lesson. This capability allows new computer users to proceed through the lessons at their own pace and during the most convenient time of day. Unlike a classroom,

the audio format's "patience" eases the disabled user's concern about falling behind in the lessons. It also eliminates the need to have a sighted or able-bodied computer user available.

"In addition to their infinite patience, the courses immediately provide an enthusiastic teacher at one's beck and call, and have inexhaustible energy," points out FlipTrack's president Lee McFadden. "And because the audio style allows the courses to be taken over and over again, they may be shared with other family members or co-workers who want to learn the computer in support of the disabled learner."

The courses also are beneficial for gifted children who may wish to learn about the computer or software faster than a typical classroom would allow. Optional, in-depth instruction or extra practice may be obtained by flipping over the tape at various points in the lesson--thus the company name "FlipTrack."

McFadden adds, "A number of studies conducted over the years have pointed to the computer as the source of one of the most promising careers for visually impaired and other disabled persons. We hope our courses will better prepare disabled persons for the job-place."

He continued, "FlipTrack's learn-by-doing format allows the disabled computer user to actually <u>experience</u> the computer. When a course is completed, the new users are more confident in putting the computer to actual use because they have already done it!"

CURRENT LIST OF FLIPTRACK COURSES

PROFESSIONAL COMPUTERS	
How to Operate the IBM Personal Computer	$69.00
How to Operate the IBM XT & AT	$89.00
How to Operate the IBM PC Jr.	$49.00
How to Operate the Apple IIe (PRO DOS version)	$59.00
How to Operate the Apple IIe (DOS 3.3 version)	$59.00
How to Operate the Apple II Plus	$59.00
How to Operate the Apple III (& III Plus)	$99.00
How to Operate the Franklin Ace 100	$49.00
OPERATING SYSTEMS	
How to Use MS-DOS (for any computer)	$69.00
How to Operate Your Computer Under CP/M (for any computer)	$69.00
How to Operate Your Computer Under CP/M-86 (for any computer)	$79.00
WORD PROCESSING	
How to Use Apple Writer	$59.00
How to Use EasyWriter II	$69.00
How to Use MultiMate	$79.00
How to Use WordStar	$69.00
How to Use WordStar & MailMerge	$89.00
SPREADSHEETS	
How to Use Multiplan	$89.00
How to Use SuperCalc	$79.00
How to Use VisiCalc	$79.00

INTEGRATED SOFTWARE	
How to Use Framework	$99.00
How to Use Lotus 1-2-3	$89.00
How to Use Symphony	$99.00
HOME COMPUTERS	
How to Operate the Coleco Adam	$39.00
How to Operate the Atari 600XL/800XL	$29.00
How to Operate the Commodore 64	$39.00
How to Operate the Commodore Vic-20	$29.00
How to Operate the Texas Instruments 99/4A	$29.00
DATABASE MANAGEMENT	
How to Use dBase III	$99.00

HOWE PRESS
175 N. Beacon Street
Watertown, MA 02172

GLP (GREAT LITTLE PRINTER) IMPACT DOT PRINTER USERS MANUAL by Centronics. (Includes additional material for the blind user by Howe Press)

MASSACHUSETTS ASSOCIATION FOR THE BLIND
200 Ivy Street
Brookline, MA 02146

Title	# of Tapes
ALD SYSTEM II	1
APPLE II PLUS REFERENCE MANUAL	1
APPLE II MONITORS PEELED MANUAL	2
APPLE II SOFT BASIC PROGRAMMING REFERENCE MANUAL	2
APPLIED FORTRAN 77	8
ARTS TERMINAL USER'S MANUAL	3
BENEATH APPLE PRO DOS	2
COBOL GLOSSARY	1
THE C PRIMER by Lee Hancock & Morris Krieger	3
COMPUTER PROGRAMMING - rpg II	5
COMPUTER SERVE INFORMATION SERVICE COMPUTING GUIDE	2
DOS MANUAL	2
8080/8085 ASSEMBLY LANGUAGE PROGRAMMING	2
EXECUTIVE GUIDE DATA COMMUNICATIONS	2
IBM FILING ASSISTANT	3
IBM VS COBOL FOR OS/VS	4
L.I.S.A. by Lazar Systems	1
MICROPROCESSOR FUNDAMENTALS by Roger L. Tokheim	5
MINDSTORMS - CHILDREN, COMPUTERS AND POWERFUL IDEAS	2
PASCAL PROMMING STRUCTURES	6
PERSONAL PROGRAMMING	3
PRINCIPLES OF PROGRAMMING LANGUAGES by R. D. Tennent	2
PROGRAMMING APPROACH TO COMPUTERABILITY	4

Title	# of Tapes
REGRE USER'S GUIDE COMPUSERVE NETWORK	1
SMART MODEM 1200 HARDWARE REFERENCE MANUAL	2
STRUCTURED PROGRAMMING IN PL/J AND PL/C	5
TOPS 10 MONITOR INTERNALS	1
TOP 10 MONITOR STRUCTURES	2
TRS MODEL 100	3
TURBO PASCAL VERSCON 20 REFERENCE MANUAL	2
UNDERSTANDING COMPUTER AND DATA PROCESSING: TODAY AND TOMORROW by Charles S. Parker	5
USER'S REFERENCE GUIDE TO TEXAS INSTRUMENTS	2
VPS PRIMER by B.U. COMPUTING CENTER	1

NATIONAL BRAILLE ASSOCIATION, INC.
1290 University Ave.
Rochester, NY 14607

HOW TO ORDER:

1. All orders must be in writing and must include:
   a) The exact title, author(s), publisher, and copyright date;
   b) Name and address of person or agency purchasing the order;
   c) Address, including zip code, to which material should be shipped.

2. All orders must be accompanied by full prepayment or an authorized purchase order for the total amount.

3. Prices: Payment must be in U.S. currency.

   The following prices are effective as of November 1, 1985.

Transcription and Duplication:

For individuals paying
with their own funds..... .12 per braille page*

Exception: Foreign Language Dictionaries .10 per braille page**

All other orders..... .35 per braille page

MINIMUM CHARGE ON ALL ORDERS.....$5.00 per title

*The cost to individuals is being subsidized by the National Braille Association.

**The cost of Foreign Language Dictionaries is being subsidized by the Percy and Helen Cleghorn Memorial Fund.

Our prices are subject to change without notice.

APPLIED SCIENCE AND TECHNOLOGY

APPLE DOS PROGRAMMER'S MANUAL FOR II, II PLUS AND IIe by Apple Computer. Apple Computer, Inc., 1982. 6 vol., 531 pp.

APPLE II DOS USER'S MANUAL FOR II, II PLUS AND IIe by Apple Computer. Apple Computer, Inc., 1973. 4 vol., 364 pp.

THE ART OF COMPUTER PROGRAMMING, VOL. I: FUNDAMENTAL ALGORITHMS by Donald E. Knuth. Addison-Wesley, 1968. 22 vol., 2032 pp.

THE ART OF COMPUTER PROGRAMMING, VOL. II: SEMI-NUMERICAL ALGORITHMS by Donald E. Knuth. Addison-Wesley, 1969. 22 vol., 1791 pp.

THE ART OF COMPUTER PROGRAMMING, VOL. III: SORTING AND SEARCHING by Donald E. Knuth. Addison-Wesley, 1973. 28 vol., 2629 pp.

BASIC CIRCUIT THEORY by Charles A. Desoer and Ernest S. Kuh. McGraw-Hill, 1969. 24 vol., 1997 pp.

COBOL PROGRAMMER'S GUIDE: Disk Tape Operating Systems by IBM. IBM System Ref. Lib. #S36-24, Form C24-5025-4 (DOS TOS in block at right). 11 vol., 629 pp.

COMPUTATION: FINITE AND INFINITE MACHINES by Marvin L. Minsky. Prentice-Hall, 1964. 10 vol., 848 pp.

COMPUTER PROGRAMMER APTITUDE BATTERY by Jean Maier Palormo. Science Research Associates, Inc., 1964. 2 vol., 113 pp.

COMPUTER PROGRAMMING FORTRAN IV by Decima Anderson. Meredith, 1966. 10 vol., 944 pp.

COMPUTING AND COMPUTER SCIENCE: A First Course by T. D. Sterling and S. V. Pollack. Macmillan, 1970. There are three versions of this book which may be ordered separately: A FIRST COURSE WITH PL/1. 11 vol., 1030 pp. A FIRST COURSE WITH FORTRAN IV. 11 vol., 1010 pp. Or the combined version, 14 vol., 1313 pp.

CONSUMER INFORMATION SERVICE USER'S GUIDES CS-467 by Compuserve, Inc., 1984. 5 vol., 393 pp.

DATA PROCESSING DICTIONARY by International Academy, a division of the L.S.I. Service Corp., July 1967. 4 vol., 328 pp.

DATA STRUCTURES, THEORY AND PRACTICE by A. T. Berztiss. Academic Press, 1971. 13 vol., 1216 pp.

DOTSYS III, A Portable Program for Grade 2 Braille Translation by W. Reed Gerhart and others. The Mitre Group, 1971. 1 vol., 103 pp.

FILGE FILE GENERATOR AND EDITOR USER'S GUIDE by Compuserve, Inc., 1979. 2 vol., 150 pp.

FINITE-STATE PROCESSES AND DYNAMIC PROGRAMMING: An IBM Research Paper by Richard N. Karp and Michael Held. IBM, 1966. 1 vol., 70 pp.

FINITE STATE SYNTAX DIRECTED BRAILLE TRANSLATION by J. K. Millen. Mitre Technical Report MTR-1829, July 2, 1970. 1 vol., 72 pp.

A FORTRAN IV PRIMER by Elliott I. Organick. Addison-Wesley, 1966. 10 vol., 1113 pp.

HONEYWELL FORTRAN TIME SHARING MANUAL; Series 1640 by Honeywell Information Systems, Inc. Honeywell Inf. Syst., Inc., 1973. (Provisional Code for Computer Notation, 1972.) 10 vol., 523 pp.

HONEYWELL TIME SHARING BASIC LANGUAGE MANUAL; Series 1640 by Honeywell Information Systems, Inc. Honeywell Inf. Syst., Inc., 1970. (Provisional Code for Computer Notation, 1972.) 7 vol., 379 pp.

THE HP-34C ADVANCED PROGRAMMABLE SCIENTIFIC CALCULATOR WITH CONTINUOUS MEMORY by Hewlett-Packard Company. Owner's Handbook and Programming Guide. Hewlett-Packard Company, 1979. 8 vol., 604 pp.

HP-34C APPLICATIONS by Hewlett-Packard Company, 1975. 2 vol., 137 pp.

IBM OS FULL AMERICAN NATIONAL STANDARD COBOL by IBM. IBM Systems Reference Library. (Contents and index only, to be used with RFP recording.) 3 vol., 157 pp. Programmer's Guide, 3 vol., 131 pp.

IBM PC DISK OPERATING SYSTEM by Microsoft Corp. International Business Machines, 1983. 10 vol., 643 pp.

INTRODUCTION TO ALGOL W PROGRAMMING by Henry R. Bauer. Computer Science Dept., Stanford Univ., July 1969. 4 vol., 314 pp.

INTRODUCTION TO ASSEMBLY LANGUAGE AND DATA STRUCTURES by Harold S. Stone. Course Notes for CS-111. Computer Science Dept., Stanford Univ., 1971. 11 vol., 773 pp.

AN INTRODUCTION TO ASM86 by Intel Corp., 1981. 5 vol., 336 pp.

INTRODUCTION TO COMPUTER SCIENCE by C. Willian Gear. Science Research Associates, 1973. 13 vol., 1238 pp. INSTRUCTOR'S GUIDE for above, 1 vol., 113 pp.

INTRODUCTION TO DATA STRUCTURES AND NON-NUMERICAL COMPUTATIONS by Peter C. Brillinger and Doron J. Cohen. Prentice-Hall, 1972. 10 vol., 961 pp.

AN INTRODUCTION TO FORTRAN IV PROGRAMMING: A General Approach by Paul W. Murrill and Cecil L. Smith. International Textbook Co., 1970. 9 vol., 815 pp.

INTRODUCTION TO FORTRAN IV WITH TIMESHARE AND BATCH OPERATION by Paul M. Chirlian. Academic Press, 1973. Includes solutions from SOLUTIONS MANUAL. 8 vol., 731 pp.

INTRODUCTION TO THE THEORY OF COMPUTATION by Erwin Engeler. Academic Press, 1973. 6 vol., 535 pp.

KEY BRAILLE CONTRACTION CONTEXTS by American Printing House for the Blind. Data Processing Dept., American Printing House for the Blind, 1969. 3 vol., 244 pp.

MATHEMATICAL METHODS FOR DIGITAL COMPUTERS by Anthony Ralston and Herbert S. Wilf. Wiley, 1960. 11 vol., 1040 pp.

PERSONAL PROGRAMMING: A Complete Owner's Manual for Programmable T158/59-Non-Commutative Rings by Roger F. Farish, Charles D. O'Grady, and Dr. Ralph A. Oliva. Texas Instruments, Inc., 1977. (1972 Nemeth Code.) 7 vol., 576 pp.

A PROGRAM ABSTRACT FOR TRANSLATING PRINT INTO BRAILLE BY COMPUTER by John R. Siems. American Printing House for the Blind, 1969. 3 vol., 228 pp.

PROPOSED BRAILLE COMPUTER TERMINAL OFFERS EXPANDED WORLD TO THE BLIND by N. C. Loeber. IBM Report, Nov, 1971. 1 vol., 18 pp.

SOLVING PROBLEMS WITH YOUR HEWLETT-PACKARD CALCULATOR by Hewlett-Packard Company, 1980. 2 vol., 122 pp.

SPECIAL INTEREST GROUP/FORUM REFERENCE MANUAL by Compuserve, Inc., 1984. 1 vol., 110 pp.

TEXAS INSTRUMENTS SUPER SLIDE-RULE CALCULATOR SR-51: Owner's Manual by Texas Instruments, Inc., 1974. 3 vol., 284 pp. Operating Guide, 1 vol., 42 pp.

NATIONAL BRAILLE PRESS INC.
88 St. Stephen Street
Boston, MA 02115

AMERICAN PEOPLE/LINK POCKET REFERENCE GUIDE ..... (inquire)

APPLE II DOT MATRIX PRINTER USER'S MANUAL
Part 1 ..... $15
Part 2 ..... $10

ASCII CHART ..... $ 2

A BEGINNER'S GUIDE TO PERSONAL COMPUTERS
FOR THE BLIND AND VISUALLY IMPAIRED by
National Braille Press, November 1983 ..... $ 6

DAISY WHEEL PRINTER BROTHER HR-15 ..... $10

DAISY WHEEL PRINTER MODEL DX-15 INSTRUCTION MANUAL by Dynax ... $10

DIABLO PRINTER MANUAL $10

GEMINI-10 DOT MATRIX PRINTER OPERATION MANUAL $10

HAYES SMARTMODEM REFERENCE MANUAL
(thanks to a grant from Hayes) $15

PARALLEL INTERFACE PRINTER CARD FOR APPLE II by Microtek $10

PC-TALK MODEM MANUAL by Headlands Press $10

PROWRITER: DOT MATRIX PRINTER by Leading Edge Products $10

THE SECOND BEGINNER'S GUIDE TO PERSONAL COMPUTERS FOR THE
BLIND AND VISUALLY IMPAIRED by National Braille Press,
October 1984--$14.95 print (includes postage); $12.95 braille
or cassette (Free Matter - add $3 for UPS shipping).

SIGNALMAN MK XII by Anchor Automation $10

SMITH CORONA MANUAL $10

TTX-1014 DAISY PRINTER USER'S MANUAL
by Teletex Communications $10

U.S. ROBOTICS "PASSWORD" MODEM MANUAL ..... free

VEN-TEL MODEM MD212-3E by Ven-Tel Inc. $10

All orders must be PREPAID; NBP will not invoice. All orders will be shipped FREE MATTER, unless postage payment is included.

NATIONAL LIBRARY SERVICE
FOR THE
BLIND AND PHYSICALLY HANDICAPPED

The following books on computers are available from the National Library Service for the Blind and Physically Handicapped; this is only a partial listing covering peripherals. For a complete listing, send for the reference circular on computers from the Library of Congress. To borrow these books, readers should contact the regional library in their area.

THE COMPLETE HANDBOOK OF PERSONAL COMPUTER COMMUNICATIONS: Everything You Need to Go On-Line With the World by Alfred Glossbrenner (braille and cassette).

INTRODUCTION TO TELEPROCESSING by James Martin (braille).

OMNI ON-LINE DATABASE DIRECTORY by Mike Edelhart and Owen Davies (cassette).

PERSONAL COMPUTERS AND THE DISABLED by Peter A. McWilliams (cassette).

TEACHING YOUR COMPUTER TO TALK: A Manual of Command and Response by Edward R. Teja (cassette).

RAISED DOT COMPUTING
408 South Baldwin
Madison, WI 53703

BRAILLE-EDIT USER'S GUIDE (Braille and audio)	$40
INTERFACE GUIDE (Braille and audio)	$40
ECHO II (Braille)	$20
BEX MANUAL (Braille and audio)	$40
CRANMER BRAILLER (Braille)	$20
APPLE IIe OWNER'S MANUAL (Braille)	$30

RECORDING FOR THE BLIND
20 Roszel Road
Princeton, NJ 08540

COMPUTALKER: MODEL CT-1 SPEECH SYNTHESIZER USER'S MANUAL. Computalker Consultants, 1980. (3)

THE CRICKET by Mike Kory and Fern Kory. Street Electronics Corp., 1985. (1)

ECHO SPEECH SYNTHESIZER: INSTALLATION AND OPERATING INSTRUCTIONS. Street Electronics Corp., 1985. (1)

ECHO II SPEECH SYNTHESIZER: INSTALLATION AND OPERATING INSTRUCTIONS. Street Electronics Corp., 1983. (1)

FREE SCAN SPEECH TERMINAL, MODEL FSST-3: OPERATION-USER'S MANUAL. Triformation Systems, Inc., 1981. (1)

HEWLETT-PACKARD TOTAL TALK II by Hewlett-Packard Company. Maryland Computer Services, 1985. (1)

RS-232 MADE EASY: CONNECTING COMPUTERS, PRINTERS, TERMINALS, AND MODEMS by Martin D. Seyer. Prentice-Hall, 1985. (3)

SOFTWARE PACKAGE II USER'S MANUAL. Computalker Consultants, 1981. (4)

(This is a partial listing; RFB has over 1,000 titles on computers.)

Access-Ability Systems
Eric Bohlman
PO Box 97
Wilmette, IL 60091
(312) 251-5787

American PEOPLE/LINK
Arlington Ridge Office Center
3215 N. Frontage Rd., Suite 1505
Arlington Heights, IL 60004
(800) 524-0100

Anchor Automation
6913 Valjean Avenue
Van Nuys, CA 91406
(818) 997-6493

Gary Anderson
70 Pearl Street
Suite 1303
Brookline, MA 02146
(617) 727-3145

Associated Services for the Blind
919 Walnut Street
Philadelphia, PA 19107
(215) 627-0600

Steven Booth
WCiS
365 Main Street
Worcester, MA 01608
(617) 791-2272 Ext. 402

Braille Inc.
157 Locust Street
Falmouth, MA 02540
(617) 540-0800

Braille Institute
741 N. Vermont Avenue
Los Angeles, CA 90029-3594
(213) 663-1111

Don Breda
322 Plymouth Street
Holbrook, MA 02343
(617) 767-0741
CompuServe ID # 70225, 1152
Source ID # BDQ462

Brother International Corp.
8 Corporate Place
Piscataway, NJ 08854
(201) 981-0300

Henry Brugsch
32 Morgan Avenue
Medford, MA 02155
(617) 391-0020

BYTE Magazine
70 Main Street
Peterborough, NH 03458
(603) 924-9281

Carroll Center for the Blind
770 Centre Street
Newton, MA 02158
(617) 969-6200

Centronics Corporation
1 Wall Street
Hudson, NH 03051
(603) 883-0111

Matthew Chao
118 Walpole Street
Norwood, MA 02062
(617) 769-7285

Duane Christianson
The Chicago Lighthouse
for the Blind
1850 West Roosevelt Road
Chicago, IL 60608
(312) 666-1331

270

CiderWare
Mike Firth
104 N. St. Mary
Dallas, TX 75214
(214) 827-7734

Computer Aids Corp.
124 W. Washington, Lower Arcade
Fort Wayne, IN 46802
(219) 422-2424
(800) 647-8255

DATEC
PO Box 13568
Research Triangle Parks, NC 27709
(800) 334-7722

DEST Corporation
1201 Cadillac Ct.
Milpitas, CA 95035
(408) 946-7100

Diablo Systems Inc.
PO Box 5030
Fremont, CA 94537
(415) 498-7000

Dialogue Magazine
3100 Oak Park Avenue
Berwyn, IL 60402
(312) 749-1908

Digital Equipment Corp.
146 Main Street
Maynard, MA 01754
(617) 897-5111

Dipner Dots
Raised Dot Computing (distributor)
(see RDC)

Duxbury Systems, Inc.
435 King Street
PO Box 1504
Littleton, MA 01640
(617) 486-9766

Enable Software Company
c/o Robert Artusy
2340 Martin Luther King Jr. Way
Suite B
Berkeley, CA 94704
(415) 540-0389

Epson America Inc.
23530 Hawthorne Blvd.
Torrance, CA 90505
(213) 373-9511

Olga Espinola
763 Grafton Street
Apt. 2
Worcester, MA 01604

FlipTrack Learning Systems
999 Main Street, Suite 200
Glen Ellyn, IL 60137
(800) 222-3547

Forty-Seventh Street Photo
36 East 19th Street
New York, NY 10003
(800) 221-5858
(800) 221-7774

Dick Gage
9 Gowing Road
Wilmington, MA 01887
W: (617) 421-9273
H: (617) 657-8422

Al Gayzagian
74 Lincoln Street
Watertown, MA 02172
W: (617) 421-6216
H: (617) 924-5291

Bob Gildea
Mitre Corp.
Box 208
Bedford, MA 01730
(617) 271-5223

Fred L. Gissoni
Kentucky Department for the Blind
427 Versailles Road
Frankfort, KY 40601
(502) 564-4754

Hayes Microcomputer Products Inc.
705 Westech Drive
Norcross, GA 30092
(404) 441-1617

Hendrix Technologies, Inc.
444 E. Industrial Park Drive
Manchester, NH 03103
(603) 669-9050

Hewlett-Packard
1820 Embarcadero Road
Palo Alto, CA 94303
(415) 857-1501
(800) 367-4772

Howe Press
c/o Perkins School for the Blind
175 North Beacon Street
Watertown, MA 02172
(617) 924-3434

IBM
Information Systems Group
900 King Street
Rye Brook, NY 10573
(914) 934-4488

IBM
1 Culver Road
Dayton, NJ 08810
(800) IBM-2468

Interface Systems International
Ned Johnson
PO Box 3289
Portland, OR 97208
(503) 256-3214

Intex Micro Systems
725 S. Adams Road, Suite L8
Birmingham, MI 48011
(313) 540-7601

Kentucky Dept. for the Blind
427 Versailles Road
Frankfort, KY 40601
(502) 564-4754

B.T. Kimbrough
1500 Locust Street
Philadelphia, PA 19101
(215) 545-1998

Kurzweil Computer Products Inc.
185 Albany Street
Cambridge, MA 02139
(617) 864-4700

Lambert Logical Design
513 Wilshire Blvd., #228E
Santa Monica, CA 90401
(213) 395-2420

Harvey Lauer
Hines V.A. Hospital
Hines, IL 60141
(312) 343-7959

Joe Lazarro
70 Highland
Revere, MA 02151
(617) 289-3828

Mark Enterprises
PO Box 1532
Westford, MA 01886
(617) 692-8570

Dean Martineau
6809 Sacramento S.W.
Tacoma, WA 98499
W: (206) 565-9000
H: (206) 588-8446

Maryland Computer Services
2010 Rock Spring Road
Forest Hill, MD 21050
(301) 879-3366

Mass. Assoc. for the Blind
200 Ivy Street
Brookline, MA 02146
(617) 738-5110

MCI Mail
(800) 424-6677

Micom Systems Inc.
20151 Nordhoff Street
Chatsworth, CA 91311
(818) 998-8844

National Braille Association Inc.
1290 University Avenue
Rochester, NY 14607
(716) 473-0900

National Braille Press Inc.
88 St. Stephen Street
Boston, MA 02115
(617) 266-6160

National Library Service for the
Blind and Physically Handicapped
1291 Taylor Street, N.W.
Washington, D.C. 20542
(800) 424-8567

Fred Noesner
SENSE-SATIONS
919 Walnut Street
Philadelphia, PA 19107
(215) 627-0603

Novation
20409 Prairie Street
Chatsworth, CA 91311
(818) 996-5060

Oberon International
600 E. Las Colinas Blvd.
Suite 1002
Irving, TX 75039
(800) 262-3766

Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
(609) 235-2600
(800) 654-3282

PC Magazine
Ziff-Davis Publishing Company
One Park Avenue
New York, NY 10016

Personal Computing Magazine
10 Mulholland Drive
Hasbrouck Heights, NJ 07604
(201) 393-6000

QUINSEPT
PO Box 216
Lexington, MA 02173
(617) 641-2930

Radio Shack
Tandy Corporation
1800 One Tandy Center
Fort Worth, TX 76102
(817) 390-3011

Raised Dot Computing
408 S. Baldwin Street
Madison, WI 55703
(608) 257-9595

Recording for the Blind
20 Roszel Road
Princeton, NJ 08540
(609) 452-0606

Noel Runyan
638 Sobrato Lane
Campbell, CA 95008
(408) 374-1609

Gayle Sabonaitis
11 Maxwell Street
Worcester, MA 01607

Barry Scheur
64 Green Park
Newton, MA 02158
(617) 965-6606

Sensory Aids Foundation
399 Sherman Avenue, Suite 12
Palo Alto, CA 94306
(415) 329-0430

Larry Skutchan
337 South Peterson
Louisville, KY 40206
W: (502) 895-2405
H: (502) 896-1288

Speech Plus
461 North Bernardo Avenue
Mountain View, CA 94043
(415) 964-7023

Star Micronics Inc.
200 Park Avenue
Suite 3510
New York, NY 10166
(212) 986-6770

Street Electronics Corporation
1140 Mark Avenue
Carpinteria, CA 93013
(805) 684-4593

Syn-Talk Systems & Services
70 Estero Avenue
San Francisco, CA 94127
(415) 334-0586

Tape Time Corporation
161 Massachusetts Avenue
Boston, MA 02115
(617) 266-3131

Telesensory Systems Inc.
455 North Bernardo Avenue
Mountain View, CA 94043
(415) 960-0920

TOTEC Co., Ltd.
OCR Systems (distributor)
One World Trade Center
New York, NY 10048
(212) 466-4667

Triformation Systems Inc.
3102 S.E. Jay Street
Stuart, FL 33497
(305) 283-4817

U.S. Robotics Inc.
8100 N. McCormick Blvd.
Skokie, IL 60076
(800) 342-5877

Ven-Tel, Inc.
2342 Walsh Avenue
Santa Clara, CA 95051
(408) 727-5721

Votrax Inc.
1358 Rankin
Troy, MI 48083
(800) 521-1350

VTEK
1625 Olympic Blvd.
Santa Monica, CA 90404
(800) 345-2256

Doug Wakefield
Talking Computers Inc.
6931 N. 27th Road
Arlington, VA 22213
(703) 241-8224

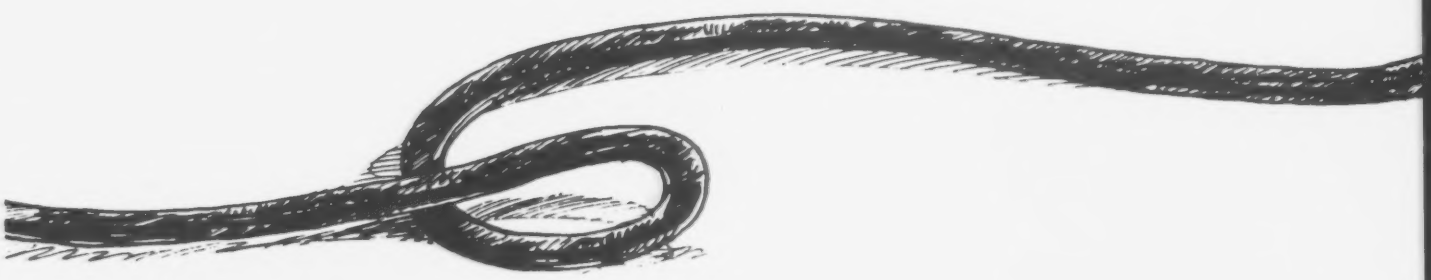
Richard D. Wright
Northern Michigan University
Department of Sociology and
Social Work
Marquette, MI 49855
(906) 227-2707

$16.95

Comments About Our Last Computer Book . . .

"*The Second Beginner's Guide* should be required reading for anyone who is wondering whether a talking computer would be a wise, or a pleasure-producing investment." —**Dialogue Magazine**

"The National Braille Press has come out with a companion to its *Beginner's Guide* . . . this excellent book contains all new material."
—**Technology Update**

"This book contains excellent advice on selecting a personal computer to meet the individual needs of persons who can benefit from talking micros . . ." —**Brookline Books**

"Your computer book is a dream come true. My 11-year-old son is blind and very interested in computers. Now he has a talking Apple IIe!" —**a parent**